LAS VIRGENES - TRIUNFO
JOINT POWERS AUTHORITY
AGENDA

4232 Las Virgenes Road, Calabasas, CA 91302

CLOSING TIME FOR AGENDA IS 8:30 A.M. ON THE TUESDAY PRECEDING THE MEETING. GOVERNMENT CODE SECTION 54954.2 PROHIBITS TAKING ACTION ON ITEMS NOT ON POSTED AGENDA UNLESS AN EMERGENCY, AS DEFINED IN GOVERNMENT CODE SECTION 54956.5 EXISTS OR UNLESS OTHER REQUIREMENTS OF GOVERNMENT CODE SECTION 54954.2(B) ARE MET.

5:00 PM May 7, 2018

PLEDGE OF ALLEGIANCE

1 CALL TO ORDER AND ROLL CALL

2 APPROVAL OF AGENDA

3 PUBLIC COMMENTS

Members of the public may now address the Board of Directors **ON MATTERS NOT APPEARING ON THE AGENDA**, but within the jurisdiction of the Board. No action shall be taken on any matter not appearing on the agenda unless authorized by Subdivision (b) of Government Code Section 54954.2

4 CONSENT CALENDAR

A Minutes: Regular Meeting of April 2, 2018 and Special Meeting of April 17, 2018 (Pg. 3)

Approve.

5 ILLUSTRATIVE AND/OR VERBAL PRESENTATION AGENDA ITEMS

A Pure Water Project Las Virgenes-Triunfo: Update

B Financial Review: Third Quarter of Fiscal Year 2017-18 (Pg. 15)

Receive and file the financial review for the third quarter of Fiscal Year 2017-18.

C Preliminary JPA Fiscal Years 2018-20 Two-Year Budget Plan (Pg. 23)

6 ACTION ITEMS

A Tapia Water Reclamation Facility Summer Season Waste Load Allocation Compliance Study: Selection of Preferred Method (Pg. 44)

Select breakpoint chlorination and discharge of potable water to Malibu Creek as the preferred method to achieve compliance with the summer season waste load

allocation for the Tapia Water Reclamation Facility, and authorize staff to finalize the Technical Memorandum for the Tapia Water Reclamation Facility Summer Season Waste Load Allocation Compliance Study.

B Tapia Water Reclamation Facility Fiscal Year 2017-18 Rehabilitation Project: CEQA Determination and Call for Bids (Pg. 65)

Find that the work is exempt from the California Environmental Quality Act and approve the issuance of a Call for Bids for the Tapia Water Reclamation Facility Fiscal Year 2017-18 Rehabilitation Project.

C Rancho Amendment Bin and Conveyance Modifications Project: Call for Bids (Pg. 71)

Find that the proposed amendment bin and conveyance equipment should be designated by specific trade name to match the existing equipment and authorize a Call for Bids for the Rancho Amendment Bin and Conveyance Modifications Project.

7 BOARD COMMENTS

8 ADMINISTERING AGENT/GENERAL MANAGER REPORT

9 FUTURE AGENDA ITEMS

10 INFORMATION ITEMS

A Tapia and Rancho Operations and Maintenance Project List: Completion (Pg. 78)

B Tapia Water Reclamation Facility Chloride Study: Investigation Report (Pg. 143)

11 PUBLIC COMMENTS

Members of the public may now address the Board of Directors **ON MATTERS NOT APPEARING ON THE AGENDA**, but within the jurisdiction of the Board. No action shall be taken on any matter not appearing on the agenda unless authorized by Subdivision (b) of Government Code Section 54954.2

12 CLOSED SESSION

A Conference with Legal Counsel – Pending Litigation (Government Code Section 54956.9(d)(1)):

Zusser Construction, Inc. v. Las Virgenes Municipal Water District

13 ADJOURNMENT

Pursuant to Section 202 of the Americans with Disabilities Act of 1990 (42 U.S.C. Sec. 12132), and applicable federal rules and regulations, requests for a disability-related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting, should be made to the Executive Assistant/Clerk of the Board in advance of the meeting to ensure availability of the requested service or accommodation. Notices, agendas, and public documents related to the Board meetings can be made available in appropriate alternative format upon request.

LAS VIRGENES – TRIUNFO
JOINT POWERS AUTHORITY
MINUTES
REGULAR MEETING

5:00 PM April 2, 2018

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance to the Flag was led by Mary Capps.

1. CALL TO ORDER AND ROLL CALL

The meeting was called to order at **5:00 p.m.** by Chair Peterson in the Board Room at Las Virgenes Municipal Water District headquarters at 4232 Las Virgenes Road in Calabasas, California. Mary Capps, Acting Clerk of the Board, conducted the roll call.

Present: Director Caspary, Lewitt, Orkney, Pan, Paule, Peterson, Polan, Renger, Tjulander, and Wall.
Absent: Director(s): None.

2. APPROVAL OF AGENDA

Administering Agent/General Manager David Pedersen requested that the agenda be amended to include a proclamation recognizing Samuel Unger, Executive Officer of Los Angeles Regional Water Quality Control Board, who retired on March 29, 2018.

Director Caspary moved to approve the agenda as amended. Motion seconded by Director Tjulander. Motion carried unanimously.

3. PUBLIC COMMENTS

None.

4. CONSENT CALENDAR

A Minutes: Regular Meeting of March 5, 2018: Approve

B Rancho Las Virgenes Raw Sludge Wet Well Recirculation Modifications Project: Final Acceptance

Execute a Notice of Completion and have the same recorded; extend the contract duration by 165 calendar days; appropriate $16,987 in additional funds; and, in the absence of claims from subcontractors and others, release the retention, in the amount of $17,795, within 30 calendar days after filing the Notice of Completion for the Rancho Las Virgenes Raw Sludge Wet Well Recirculation Modifications Project.

C Digester No. 1 Rehabilitation Project: Approve of Scope Change

Authorize the Administering Agent/General Manager to execute a Change of Scope, in the amount of $10,158, for Pacific Advanced Civil Engineering, Inc., to provide additional services during construction for the Digester No. 1 Rehabilitation Project.

Director Caspary moved to approve the Consent Calendar. Motion seconded by Director Wall. Motion carried unanimously.

5. ILLUSTRATIVE AND/OR VERBAL PRESENTATION AGENDA ITEMS

A Pure Water Project Las Virgenes-Triunfo: Update

Administering Agent/General Manager David Pedersen explained that the Washington D.C. lobbying trip would be Monday, April 9 through Wednesday, April 11, 2018. Directors Peterson, Lewitt, Wall and Pan would be attending along with Mark Norris, Mike McNutt and David Pedersen. Mr. Pedersen stated that attendees would be arriving Sunday night or Monday morning, and a Monday night dinner with John Freshman was planned to strategize for meetings on Tuesday and Wednesday. He explained that the attendees planned to meet with each of the Congressional representatives for the JPA's service area, along with representatives from the U.S. EPA and U.S. Bureau of Reclamation. Mr. Pedersen also stated that staff had updated the JPA's leave-behind document, shortening and clarifying the message.

Mr. Pedersen also reported that the Agoura Road property purchase was in escrow for its purchase and sale; the previous escrow was for the option agreement. He explained that staff was checking off all of the items required for closing and had reviewed the title policy. He stated that there might be a couple of endorsements staff would recommend on the title policy for the purpose of clarification but no items of concerns. He explained that escrow had the signed grant deed, staff was preparing to wire the final purchase payment and escrow was expected to close as early as Friday. Mr. Pedersen stated that the grant deed would be recorded and that he would report to the Board when the purchase was completed.

David Lippman, Director of Facilities and Operations reminded the board that there would be a workshop on the Pure Water Demonstration Project on April 17, 2018 at 5:00 p.m. David Lippman asked that the Board complete and return the questionnaire to the Clerk of the Board by April 11, 2018.

David Lippman, Director of Facilities and Operations updated the Board on the Pure Water Project Las Virgenes-Triunfo: Mixing and Dilution Study. He explained that the next step would be to convene an independent advisory panel on May 4, 2018. The panel would answer two very important questions: (1) would the project comply with reservoir water augmentation regulations issued by the State Water Resources Control Board (SWRCB); and (2) should any additional modeling be completed? Mr. Lippman explained that the report from the independent advisory panel would allow staff to initiate specific conversations with the regulatory authorities, including the SWRCB Division of Drinking Water and Los Angeles Regional Water Quality Control Board.

The Board was provided with a copy of the program from the Town Hall Session at the Water Reuse Conference where Director Caspary served as a panelist. The program topic was "The Elected Officials Perspective on the Trials and Tribulations of Developing a Potable Reuse Project". The program provided examples of potable reuse projects taking place in the state and provided useful information for the Pure Water Project Las Virgenes-Triunfo.

B Proclamation in Recognition of Retirement: Samuel Unger, Executive Officer of Los Angeles, California Regional Water Quality Control Board

Chair Peterson presented a proclamation to Samuel Unger, Executive Officer of Los Angeles Regional Water Quality Control Board (RWQCB) in recognition of his retirement on March 29, 2018. Mr. Unger thanked the JPA Board and stated that it was honor to receive the proclamation.

Director Orkney stated that it was always comforting to know that Mr. Unger was with the RWQCB.

Director Caspary thanked Mr. Unger for his leadership with the RWQCB and stated that it made a big difference, resulting in a positive impact for the JPA and its neighbors.

Director Lewitt thanked Mr. Unger for his support of and compliments for the JPA.

Director Pan acknowledged and expressed appreciation for Mr. Unger’s integrity, fair mindedness and support.

Director Peterson thanked Mr. Unger for his work.

Administering Agent/General Manager David Pedersen expressed appreciation to Mr. Unger for always being willing to meet with the JPA and serve as a problem solver when faced with challenging issues.

6. ACTION ITEMS

A Infrastructure Investment Plan: Fiscal Years 2018-19 through 2022-23

Receive and file the JPA Infrastructure Investment Plan for Fiscal Years 2018-19 through 2022-23.

David Lippman, Director of Facilities and Operations presented the report.

Director Paule moved to approve Item 6A. Motion seconded by Director Tjulander. Motion carried unanimously.

B Relocation of Conrad N. Hilton Foundation 115kW Solar Carport System: Award

Authorize the Administering Agent/General Manager to execute a service agreement, in the amount of $65,443.84, to Go Green Solar Solutions, Inc., for the disassembly and transport of a 115kW solar carport system to a JPA-owned site for temporary storage.

Administering Agent/General Manager David Pedersen presented the report.

Director Renger moved to approve Item 6B. Motion seconded by Director Paule, Motion carried unanimously.

C Heal the Bay's "Bring Back the Beach" Event: Attendance

Authorize one Board Member from each agency and the Administering Agent/General Manager to attend the Heal the Bay "Bring Back the Beach" Event at a cost of $600 per person.

Administering Agent/General Manager David Pedersen presented the report.

Director Paule moved to approve Item 6C. Motion seconded by Director Pan. Motion carried unanimously.

7. BOARD COMMENTS

None.

8. ADMINISTERING AGENT/GENERAL MANAGER REPORT

None.

9. FUTURE AGENDA ITEMS

None.

10. INFORMATION ITEMS

A Annual Bioassessment Monitoring Report: Approval of Purchase Order

B Rancho Las Virgenes Composting Facility Rain Gutter Replacement: Authorization of Purchase Order

C Tapia Water Reclamation Facility Switchgear and Transformer Maintenance

11. PUBLIC COMMENTS

None.

12. CLOSED SESSION

A Conference with Legal Counsel – Pending Litigation (Government Code Section 54956.9(d)(1):

Zusser Construction, Inc. v. Las Virgenes Municipal Water District

The Board recessed to Closed Session at **5:54 p.m.,** and reconvened to Open Session at **6:07 p.m.**

Authority Counsel Keith Lemieux announced that during Closed Session the JPA retained Olivarez Madruga Lemieux O'Neill, LLP in connection with the pending litigation between Zusser, Inc.

13. ADJOURNMENT

Seeing no further business to come before the Board, the meeting was duly adjourned in honor of Alice C. Stelle at **6:08 p.m**.

Glen Peterson, Chair

ATTEST:

Michael Paule, Vice Chair

LAS VIRGENES – TRIUNFO
JOINT POWERS AUTHORITY
MINUTES
SPECIAL MEETING

5:00 PM April 17, 2018

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance to the Flag was led by Wayne Lemieux.

1. CALL TO ORDER AND ROLL CALL

The meeting was called to order at **5:00 p.m.** by Chair Peterson in the Board Room at Las Virgenes Municipal Water District headquarters at 4232 Las Virgenes Road in Calabasas, California. Josie Guzman, Clerk of the Board, conducted the roll call.

Present: Directors Caspary, Lewitt, Orkney, Pan, Paule, Peterson, Polan, Tjulander, and Wall.
Absent: Director Renger
Staff: David Pedersen, Administering Agent/General Manager
David Lippman, Director of Facilities and Operations
Joe McDermott, Director of Resource Conservation and Public Outreach
Donald Patterson, Director of Finance and Administration
Doug Anders, Administrative Services Coordinator
Brett Dingman, Water Reclamation Manager
Mike McNutt, Public Affairs and Communications Manager
Larry Miller, Water System/Facilities Manager
Dave Roberts, Resource Conservation Manager
John Zhao, Principal Engineer
Josie Guzman, Clerk of the Board
Wayne Lemieux, District Counsel

Representatives from the following organizations:

Carollo Engineers (Lydia Holmes, Jeff Moser, Andy Salveson, and Adam Zacheis); El Dorado Architects (Hesse McGraw and Josh Shelton; New Water ReSources (Linda MacPherson); Triunfo Sanitation District (Mark Norris and John Mathews)

2. PUBLIC COMMENTS

None.

3. PURE WATER DEMONSTRATION PROJECT WORKSHOP

Administering Agent/General Manager David Pedersen provided background information regarding previous stakeholders' workshops that led to the development of a public outreach program for the Pure Water Program.

Adam Zacheis, Jeff Mosher, and Andy Salveson, representing Carollo Engineers, provided a PowerPoint presentation and conducted the workshop.

The Board provided the following feedback:

- Cost of pilot program and benefits
- Demonstration of commitment to transparency
- Understanding regulatory requirements
- Assistance with obtaining grants
  - Show commitment to the project
  - United States Bureau of Reclamation could visit the site
- Construction phase impacts to the community
  - Outreach
- Water quality – demonstrate removal of chemicals/pathogens, microfibers, antibiotic resistant bacteria, nanoparticles
- Pathogen removal – log removal is difficult to describe
- Testing different technologies
  - Reverse osmosis filters
  - Desalination technology
- Comparison of cost
  - Costs alternatives for desalination or other water sources
  - Costs and availability
- Drought proof/resilient water
- Safety of treatment process; off-spec water
- Noise control
- Use of critical control points
  - Intelligent monitoring
  - Supervisory Control and Data Acquisition (SCADA)
- Demonstrate level of monitoring to the public/notification of alert or alarm
- Multiple barriers that are the key to success

The Board recessed to a break at 6:04 p.m. and reconvened at 6:20 p.m.

Lydia Holmes, representing Carollo Engineers, continued the PowerPoint presentation showing demonstration facilities in Monterey, Soquel Creek Water

District, and Ventura Water.

The Board provided the following feedback:

- Use videos with animation showing what drove the project and showing the treatment process
- Keep the demonstration facility as simple as possible
- Include the video where the Board explained to the Regional Water Quality Control Board the cost to treat the water discharged to the creek.
- Use videos and education materials from other demonstration facilities
- Set up a visitor or information center
- Set up a welcoming facility with information and transparency of the system and process that could also be used as a community resource
- Focus on advanced water treatment
- Use demonstration area as a public space and upgrade the bathrooms to minimum standards in the demonstration facility
- Provide the ability to visually see the water going in and out
- Have a freestanding facility where people could go through on their own without having to interact with anybody

Linda MacPherson, New Water ReSources, continued the PowerPoint presentation showing a concept for a possible tour route of the demonstration facility, including an orientation video, directional signage, possible tour stops, sign stands and graphic displays, banners, boxed water as a marketing concept, directional floor graphics, and alternative tasting area in the patio area.

Josh Shelton and Hesse McGraw, representing El Dorado Architects, continued the PowerPoint presentation showing architectural themes. Mr. McGraw highlighted projects to ignite public imagination including a project for a temporary rainwater capture system that produces rainbows over the building and another project involving sharing stories from the region.

The Board provided feedback on the education and architectural aspects:

- Demonstrate that the treatment process can be exciting
  - Beauty in the pipes and infrastructure
  - Having the “invisible” infrastructure revealed
  - Develop an emotional connection and fascination with this technology
- Taste the water
- Understand how the process is done. Reveal the process.
- Use art to help connect the project to the sense of magic
  - Use of art and imagination pieces
- Include a clock to demonstrate how much time each process takes to complete
  - Step-by-step process
- Include signage at the entrance of the demonstration facility such as

"Welcome to the Future of Water"

- Consider Monterey's demonstration facility and reconsider the use of the whole building
  - Keep the chemicals outside of the building
  - Keep the demonstration facility as simple as possible
  - Use architect's help to build the plant
  - Keep the demonstration facility underwhelming
  - Include the history leading up to the Pure Water Project, including when Tapia Water Reclamation Facility was opened, all of the permits, and the costs over the years
  - Demonstrate what was taken out of the water
  - Include a sink and a glass at the end
  - Have the actual plant architecturally blend in
- Keep it simple, focused, effective, and deliberate
  - Use the Monterey process as a model
- Make it inviting
- Pragmatic ways to look at how to accomplish goals for public engagement
- No need to go out to the patio where the chemicals are stored
- Repurpose the Board Room
- Include a video in the room
- Include outreach on the types of chemicals that will be used in the process
  - Consider the public's trust and confidence
- Social media
  - Reach others
- "Fire off a tweet" at the end of the tour for the public to share their excitement
- Kids can convince their parents that this is "the right thing to do" and it is worth the money to clean up the environment and have better quality water
  - Demonstration facility will be a draw for students and families
  - Project is high-tech, sustainable, and utilizes local resources
- Encourage social media by having a banner stating "I tasted the water"
  - People could take a selfie under the banner
- Reconsider the value of the boxed water
  - Important to show the water as something clear and pure
  - Consider handing out glasses with water that the public may take home
- The demonstration facility could be a destination site
- Demonstrate the sustainability of the project. Make the connection with conservation
- Environmental support/restoration
- Concern that the water treated at the demonstration facility is not the actual water because it still needs to be sent to the reservoir
- Explain the reason for the project
  - Tell the story

Administering Agent/General Manager David Pedersen stated that the Project Team would take the Board's feedback and bring back a concept for a Demonstration Project.

4. ADJOURNMENT

Seeing no further business to come before the Board, the meeting was duly adjourned at **7:35 p.m**.

Glen Peterson, Chair

ATTEST:

Michael Paule, Vice Chair

May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Finance & Administration

Subject : Financial Review: Third Quarter of Fiscal Year 2017-18

SUMMARY:

The third quarter financial review presents data as of March 31, 2018. It is important to note that due to the timing of various projects and payments, the third quarter financial review should primarily be used to identify areas where an emerging trend may affect the JPA's position at fiscal year-end.

RECOMMENDATION(S):

Receive and file the financial review for the third quarter of Fiscal Year 2017-18.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

There is no financial impact associated with this action.

DISCUSSION:

The JPA's third quarter net uses of funds for Fiscal Year 2017-18 totaled $11.7 million, compared to $13.9 million for the same period in Fiscal Year 2016-17. There was a year-over-year increase in operating revenue of 18.4% and an increase in operating expenditures of 4.6%. The increase in revenues was primarily due to increased recycled water sales. Capital project expenditures were approximately $1.5 million less than the same period during the prior year.

When comparing to Fiscal Year 2017-18 budget estimates through the third quarter, actual operating expenditures were approximately $1.2 million (9.8%) below budget, primarily due to lower than expected energy, chemical, and sprayfield costs, as well as decreased

maintenance labor hours. Capital project expenditures were approximately $1.2 million (35.7%) below budget estimates, primarily due to the timing of expenditures for planned projects.

Prepared by: Angela Saccareccia, Finance Manager

ATTACHMENTS:

Third Quarter Financial Comparison
Status of Capital Improvement Projects

Joint Powers Authority Operations

Quarterly Update - Comparison to Budget & Prior Year at March 31, 2018

	FY 16-17 Actual YTD	FY 17-18 Budget YTD	FY 17-18 Actual YTD
Total Operating Revenues	$ 1,376,124	$ 1,806,713	$ 1,629,138
RW Pump Station	896,611	901,096	900,160
RW Tanks & Reservoirs	103,013	80,144	44,466
RW System Operations	20,507	28,955	16,141
RW Distribution	103,097	77,236	88,487
Sewer	108,533	183,583	68,431
Waste Water Treatment	5,195,445	5,993,505	5,829,305
Composting	3,190,494	3,857,878	3,427,696
Centrate Treatment	231,661	325,334	209,999
Adminstration	854,114	954,076	607,176
Total Operating Expenses	10,703,475	12,401,807	11,191,861
Net Operating (Expenses)	$ (9,327,351)	$ (10,595,094)	$ (9,562,723)

Joint Powers Authority Operations
Quarterly Update - Comparison to Budget & Prior Year at March 31, 2018
FY 17-18 Year To Date

	FY 16-17 Actual YTD	FY 17-18 Budget YTD	FY 17-18 Actual YTD
Las Virgenes Share:			
Total Revenues			
Operating Revenues	$ 971,544	$ 1,275,539	$ 1,150,171
Total Revenues	971,544	1,275,539	1,150,171
Total Expenses			
Operating Expenses	$ 7,374,694	$ 8,306,883	$ 7,711,192
Capital Project Expenses	2,633,824	2,397,177	1,541,613
Total Expenses	10,008,518	10,704,060	9,252,805
Net (Uses) of Funds - LV	$ (9,036,975)	$ (9,428,520)	$ (8,102,634)
Triunfo Share:			
			$ (8,102,634)
Total Revenues			
Operating Revenues	$ 404,580	$ 531,174	$ 478,967
Total Revenues	404,580	531,174	478,967
Total Expenses			
Operating Expenses	$ 3,328,781	$ 4,094,924	$ 3,480,669
Capital Project Expenses	1,096,805	998,258	641,975
Total Expenses	4,425,586	5,093,181	4,122,644
Net (Uses) of Funds - TSD	$ (4,021,005)	$ (4,562,008)	$ (3,643,677)
Total JPA Net (Uses) of Funds	$ (13,057,980)	$ (13,990,528)	$ (11,746,311)

Joint Powers Authority Operations

Quarterly Update - Comparison to Budget & Prior Year at March 31, 2018

FY 17-18 Year To Date

	FY 16-17 Actual YTD	FY 17-18 Budget YTD	FY 17-18 Actual YTD
Total Revenues			
Operating Revenues	$ 1,376,124	$ 1,806,713	$ 1,629,138
Total Revenues	1,376,124	1,806,713	1,629,138
Total Expenses			
Operating Expenses	$ 10,703,475	$ 12,401,807	$ 11,191,861
Capital Project Expenses	3,730,629	3,395,434	2,183,588
Other	-	-	-
Total Expenses	14,434,104	15,797,241	13,375,449
Net (Uses) of Funds	$ (13,057,980)	$ (13,990,528)	$ (11,746,311)
Las Virgenes Share	(9,218,934)	(9,428,520)	(8,102,634)
Triunfo Share	(3,839,046)	(4,562,008)	(3,643,677)

Las Virgenes - Triunfo Joint Powers Authority
Capital Improvement Project Status
March 31, 2018

Job # - Description	*LV %*	*TSD %*	*Total Project Appropriations*	*Prior Year Expenditures*	*Current Year Expenditures*	*Total Project Expenditures*	*Project Balance*	*LV Balance*	*TSD Balance*
Completed Projects									
10621 - RW Tank Coating Evluatn/Repair	**70.6%**	**29.4%**	**$30,000**	**$0**	**$23,614**	**$23,614**	**$6,386**	**$4,509**	**$1,877**
The project consists of evaluating the coatings of three (3) steel tanks (Indian Hills, Parkway, Cordillera), that have been identified as needing possible rehabilitation based upon the annual diver's inspection report.									
Total Completed Projects			***$30,000***	***$0***	***$23,614***	***$23,614***	***$6,386***	***$4,509***	***$1,877***
Projects to complete by June 30, 2018									
10537 - Raw Sludge WetWell Mixing Impv	**70.6%**	**29.4%**	**$584,942**	**$104,801**	**$462,269**	**$567,070**	**$17,872**	**$12,618**	**$5,254**
Replace the existing raw sludge mixing pump at Tapia with a more suitable unit. Appropriate additional $240,328. Agenda Item 6A, 7/10/2017.									
10540 - Lost Hills Overpass RW Main	**70.6%**	**29.4%**	**$737,324**	**$115,601**	**$395,510**	**$511,111**	**$226,213**	**$159,706**	**$66,507**
Relocation of recycled water main due to demolition of Lost Hills overpass. In Progress / Construction									
10565 - Rancho LV:Digester Cleang/Rpr	**70.6%**	**29.4%**	**$1,789,494**	**$271,561**	**$217,638**	**$489,199**	**$1,300,295**	**$918,008**	**$382,287**
Clean out and evaluate the condition of digesters that have been in service for more than 20 years. Appropriate additional $709,788. Agenda Item 7A, 8/7/2017.									
10589 - WIMS Software Implementation	**70.6%**	**29.4%**	**$32,350**	**$25,740**	**$0**	**$25,740**	**$6,610**	**$4,667**	**$1,943**
Purchase and installation of water information management solution (WIMS).									
10597 - Tapia E&I Upgrades	**70.6%**	**29.4%**	**$66,000**	**$0**	**$31,861**	**$31,861**	**$34,139**	**$24,102**	**$10,037**
Replace obsolete and malfunctioning mechanical protective relays for generators with new solid state controls. Planning/Design									
10641 - Tapia Lighting EfficiencyUpgrd	**70.6%**	**29.4%**	**$469,920**	**$0**	**$246,541**	**$246,541**	**$223,379**	**$157,706**	**$65,673**
Replace internal and external lights at Tapia									
10643 - Rancho Reliability Imprv 17-18	**70.6%**	**29.4%**	**$132,000**	**$0**	**$343**	**$343**	**$131,657**	**$92,950**	**$38,707**
Miscellaneous repair or replacement of Rancho assets									

Job # - Description	LV %	TSD %	Total Project Appropriations	Prior Year Expenditures	Current Year Expenditures	Total Project Expenditures	Project Balance	LV Balance	TSD Balance
Projects to complete by June 30, 2018									
10646 - Tapia WRF Relib Imprv FY17-18	**70.6%**	**29.4%**	**$132,000**	**$0**	**$93,886**	**$93,886**	**$38,114**	**$26,908**	**$11,206**
Miscellaneous repair or replacement of Tapia assets									
Total Projects to complete by June 30, 2018			***$3,944,030***	***$517,703***	***$1,448,048***	***$1,965,751***	***$1,978,279***	***$1,396,665***	***$581,614***
Multi-Year Projects									
10564 - Centrate Equalization Tank	**70.6%**	**29.4%**	**$2,343,008**	**$1,972,093**	**$74,770**	**$2,046,863**	**$296,145**	**$209,078**	**$87,067**
Construct a centrate equalization tank at the centrate treatment facility at Rancho.									
10608 - Rancho Amndmnt Bin&Convync Mod	**70.6%**	**29.4%**	**$428,650**	**$53,090**	**$109,785**	**$162,875**	**$265,775**	**$187,637**	**$78,138**
The project consists of installing a new smaller amendment bin and modification to the conveyor system to simplify the amendment conveyance process. Planning/Design									
10619 - Summer Season 2013 TMDL Compln	**70.6%**	**29.4%**	**$200,000**	**$0**	**$18,760**	**$18,760**	**$181,240**	**$127,955**	**$53,285**
Construction of a 1MGD "side stream" treatment facility at Tapia to treat stream flow augmentation discharges to the 2013 TMDL limits of 1 mg/L total nitrogen and 0.1 mg/L total phosphorous. The cost estimate is based on membrane technology.									
10626 - Process Air Improvements	**70.6%**	**29.4%**	**$1,621,584**	**$143,131**	**$130,834**	**$273,965**	**$1,347,619**	**$951,419**	**$396,200**
The first phase is to replace the existing Roots blowers with new, high effiency, single stage blowers. To replace the air diffusers in the aeration basins with new full floor mounted fine bubble diffusers.									
10629 - Cny Oaks Prk RW Main Extension	**70.6%**	**29.4%**	**$399,780**	**$1,937**	**$2,967**	**$4,904**	**$394,876**	**$278,782**	**$116,094**
This extension will serve the City of Westlake Village's Oak Canyon Park and eliminate a long private service line to Yerba Buena School. from Proj 10602 Funding from Prop 84 IRWM 2015									
10635 - PURE WATER PROJECT	**70.6%**	**29.4%**	**$1,850,000**	**$0**	**$26,856**	**$26,856**	**$1,823,144**	**$1,287,140**	**$536,004**
This project funds preliminary studies, outreach, CEQA analysis, preliminary design and final design.									
10636 - Mixing & Dilution Study	**70.6%**	**29.4%**	**$0**	**$62,250**	**$112,796**	**$175,046**	**($175,046)**	**($123,582)**	**($51,464)**
sub project of 10635 Pure Water Project									
10637 - Facility Siting Study	**70.6%**	**29.4%**	**$0**	**$176,526**	**$3,231**	**$179,757**	**($179,757)**	**($126,908)**	**($52,849)**
sub project of 10635 Pure Water Project									
10638 - Demonstration Project	**70.6%**	**29.4%**	**$0**	**$80,607**	**$33,714**	**$114,321**	**($114,321)**	**($80,711)**	**($33,610)**
sub project of 10635 Pure Water Project									

Job # - Description	LV %	TSD %	Total Project Appropriations	Prior Year Expenditures	Current Year Expenditures	Total Project Expenditures	Project Balance	LV Balance	TSD Balance
Multi-Year Projects									
10650 - Land Acquisition-PureWtr Proj	**70.6%**	**29.4%**	**$2,000,000**	**$0**	**$122,316**	**$122,316**	**$1,877,684**	**$1,325,645**	**$552,039**
sub project of 10635 Pure Water Project									
10653 - Tapia Rehab FY17-18	**70.6%**	**29.4%**	**$1,549,100**	**$0**	**$75,897**	**$75,897**	**$1,473,203**	**$1,040,081**	**$433,122**
Combine projects 10647, 10648, 10649 for ease of administration of the projects. Concrete repair and installation of protective coatings Replace ten RAS gates Replace grit piping and grit valves as well as primary skimming pipe									
Total Multi-Year Projects			***$10,392,122***	***$2,489,634***	***$711,926***	***$3,201,560***	***$7,190,562***	***$5,076,537***	***$2,114,025***
Projects on Hold									
10520 - SCADA System Communictn Upgrd	**70.6%**	**29.4%**	**$93,100**	**$32,447**	**$0**	**$32,447**	**$60,653**	**$42,821**	**$17,832**
Upgrade the JPA owned portion of the supervisory control and data acquisition system (SCADA) system to an Ethernet based radio network and provide additional data paths for system redundancy.									
10567 - Progmble Logic Contrlr Upgrd	**70.6%**	**29.4%**	**$332,850**	**$0**	**$0**	**$0**	**$332,850**	**$234,992**	**$97,858**
Replace obsolete programmable logic controllers and upgrade other electrical equipment at Tapia.									
10611 - Tapia Duct Bank Infrstrc Upgrd	**70.6%**	**29.4%**	**$66,000**	**$0**	**$0**	**$0**	**$66,000**	**$46,596**	**$19,404**
Add new duct bank from the front gate to the chemical building with several intercept points along the way.									
10617 - Flow Meter Replacement - JPA	**70.6%**	**29.4%**	**$25,849**	**$0**	**$0**	**$0**	**$25,849**	**$18,249**	**$7,600**
Replace end of life flow meters at two (2) locations. Includes the purchase of wireless flow meters and installation. Monthly service includes maintenance and monitoring.									
Total Projects on Hold			***$517,799***	***$32,447***	***$0***	***$32,447***	***$485,352***	***$342,659***	***$142,693***
Totals			**$14,883,951**	**$3,039,784**	**$2,183,588**	**$5,223,372**	**$9,660,579**	**$6,820,369**	**$2,840,210**
Totals: Las Virgenes MWD			**$10,508,069**	**$2,146,088**	**$1,541,613**	**$3,687,701**	**$6,820,369**		
Totals: Triunfo Sanitation District			**$4,375,882**	**$893,696**	**$641,975**	**$1,535,671**	**$2,840,210**		

May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Finance & Administration

Subject : Preliminary JPA Fiscal Years 2018-20 Two-Year Budget Plan

SUMMARY:

On March 5, 2018, staff presented the JPA Board with a budget overview and discussed the primary drivers and assumptions for the Two-Year Budget Plan. At the meeting, staff will present the Preliminary JPA Two-Year Budget Plan for the Fiscal Years 2018-20.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

There is no financial impact associated with this item.

DISCUSSION:

The primary assumptions driving the budget preparation were the expected stabilization of on-going drought impacts (inflow, infiltration and conservation) and flat wholesale recycled water sales for each of the budget years.

The preliminary budget for operating expenses in Fiscal Year 2018-19 is $17.0 million, which is $349,000 or 2.1% more than the prior year budget. The preliminary capital improvement projects budget, including carryover amounts, is $16.4 million. Following are the notable projects included with newly-proposed appropriations:

- Rancho Amendment Bin and Conveyance Modification Project ($1.3 million)
- Process Air Improvements Project ($2.1 million)
- Pure Water Project Las Virgenes-Triunfo ($4.5 million)
- Cordillera Tank Rehabilitation ($1.2 million)

The preliminary budget for operating expenses in Fiscal Year 2019-20 is $17.4 million, which is $380,000 or 2.2% more than Fiscal Year 2018-19. The capital improvement projects budget is $8.7 million. Following are the notable projects included with newly-proposed appropriations:

- Summer Season TMDL Compliance ($2.2 million)
- Pure Water Project Las Virgenes-Triunfo ($3.5 million)
- Rancho Las Virgenes Digester Cleaning and Repair ($1.3m)

Prepared by: Angela Saccareccia, Finance Manager

ATTACHMENTS:

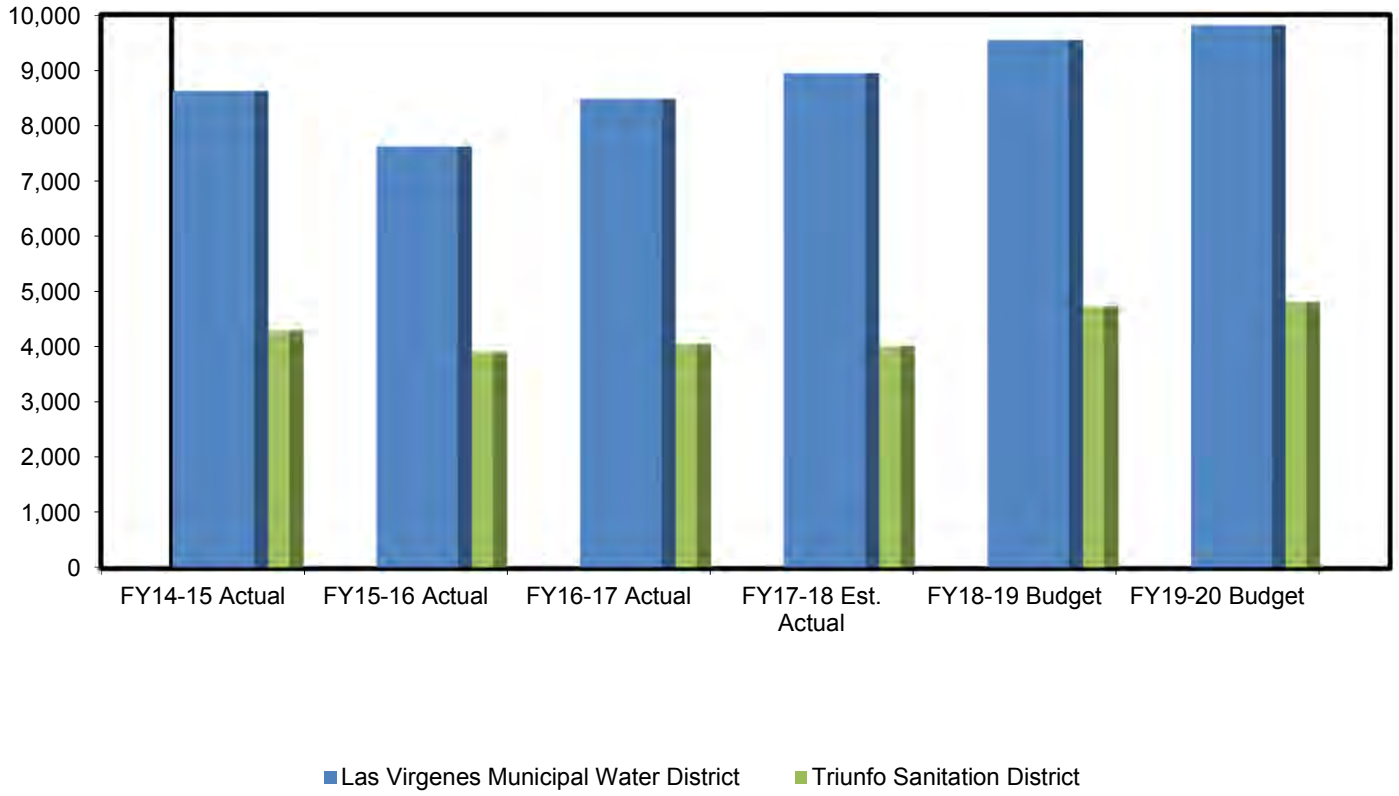
JPA Fiscal Years 2018-20 Two-Year Budget Plan

Las Virgenes – Triunfo Joint Powers Authority

Preliminary Budget Summary
FY 2018-19 and FY 2019-20

Las Virgenes - Triunfo
Joint Powers Authority
Allocated Net Expense Summary
(Dollars in Thousands)

	FY14-15 Actual	FY15-16 Actual	FY16-17 Actual	FY17-18 Est. Actual	FY18-19 Budget	FY19-20 Budget
JPA Revenues	2,326	2,346	2,168	2,449	2,735	2,767
JPA Expenses	15,189	13,920	14,755	15,441	17,043	17,423
Net Operating Expense	12,863	11,574	12,587	12,992	14,308	14,656
Non-Operating Revenue (Expense)	(66)	34	45	20	20	20
Net Expenses	12,929	11,540	12,542	12,972	14,288	14,636
Las Virgenes Municipal Water District	8,624	7,623	8,483	8,941	9,545	9,810
Triunfo Sanitation District	4,305	3,917	4,059	4,030	4,745	4,825
Total Allocated Expenses	12,929	11,540	12,542	12,971	14,290	14,635



FISCAL YEAR 2017-18 ESTIMATED ACTUAL

ALLOCATION OF JOINT POWERS EXPENSES TO PARTICIPANTS

EXPENSES (REVENUES)	JPA EXPENSES BY ALLOCATION GROUPS					
SEWER EXPENSE	126,937	0	0	0	0	126,937
TREATMENT RECLAMATION	0	4,970,836	2,696,999	0	0	7,667,835
TREATMENT COMPOSTING	0	3,109,102	1,623,826	0	0	4,732,928
TREATMENT INJECTION	0	149,565	144,529	0	0	294,094
PUMP STATIONS	0	1,280,420	0	0	0	1,280,420
TANKS/RESERVOIR WELLS	0	75,601	0	0	0	75,601
SYSTEM OPERATION	0	26,084	0	0	0	26,084
WATER SYSTEM	0	120,664	0	0	0	120,664
ADMINISTRATIVE EXPENSES	0	1,107,303	0	3,495	0	1,110,798
TAPIA WAREHOUSE	0	4,840	0	0	0	4,840
REVENUES	0	(2,448,539)	0	0	(20,000)	(2,468,539)
TOTAL EXPENSES	126,937	8,395,875	4,465,354	3,495	(20,000)	12,971,661
	A	B	C	D	E	TOTAL

PARTICIPANTS SHARE	ALLOCATION OF EACH GROUP TO PARTICIPANTS											
	%	$	%	$	%	$	%	$	%	$		
U-1 SANITATION DISTRICT	36.3%	46,078	53.1%	4,990,009	42.3%	1,888,845	25.0%	874	82.2%	(16,449)	53.3%	6,909,357
U-2 SANITATION DISTRICT	3.1%	3,935	17.5%	1,644,541	20.7%	924,328	25.0%	874	0.0%	0	19.8%	2,573,678
RECYCLED WATER FUND				(541,752)							-4.2%	(541,752)
LVMWD	39.4%	50,013	70.6%	6,092,798	63.0%	2,813,173	50.0%	1,748	82.2%	(16,449)	68.9%	8,941,283
TRIUNFO SANITATION DISTRICT	60.6%	76,924	29.4%	2,303,077	37.0%	1,652,181	50.0%	1,747	17.8%	(3,551)	31.1%	4,030,378
TOTAL ALLOCATION	100.0%	126,937	100.0%	8,395,875	100.0%	4,465,354	100.0%	3,495	100.0%	(20,000)	100.0%	12,971,661
	A		B		C		D		E		TOTAL	

GROUP

A Basis of allocation to each participant is participant's reserve capacity rights in the trunk sewer.

B Basis of allocation to each participant is participant's reserve capacity rights in the treatment plant and recycled water system.

C Basis of allocation to each participant is participant's flow into the treatment plant.

D Each participant is allocated an equal share.

E Basis of allocation is each participant's average monthly cash balance.

PARTICIPANT	PROJECTED SEWAGE FLOWS			ALLOCATION OF TOTAL EXPENSES TO PARTICIPANTS		
	MILLION GALLONS PER DAY (MGD)	MILLION GALLONS PER YEAR (MG)	PERCENT BASED ON FLOWS	TOTAL EXP	$ PER MG	%
U-1 SANITATION DISTRICT	2.64	965	42.3%	6,501,892	6,738	50.1%
U-2 SANITATION DISTRICT	1.29	471	20.7%	2,439,391	5,179	18.8%
LVMWD	3.93	1,436	63.0%	8,941,283	6,227	68.9%
TRIUNFO SANITATION DISTRICT	2.31	843	37.0%	4,030,378	4,781	31.1%
TOTAL ALL PARTICIPANTS	6.24	2,279	100.0%	12,971,661	5,692	100.0%
RETURN FLOWS	1.36	498				
WESTLAKE WELLS	0.34	123				
	7.95	2,900				

FISCAL YEAR 2018-19 OPERATING BUDGET

ALLOCATION OF JOINT POWERS EXPENSES TO PARTICIPANTS

EXPENSES (REVENUES)	JPA EXPENSES BY ALLOCATION GROUPS					
SEWER EXPENSE	145,013	0	0	0	0	145,013
TREATMENT RECLAMATION	0	5,759,363	2,875,654	0	0	8,635,017
TREATMENT COMPOSTING	0	3,480,400	1,827,857	0	0	5,308,257
TREATMENT INJECTION	0	168,127	149,994	0	0	318,121
PUMP STATIONS	0	1,340,559	0	0	0	1,340,559
TANKS/RESERVOIR WELLS	0	130,455	0	0	0	130,455
SYSTEM OPERATION	0	46,435	0	0	0	46,435
WATER SYSTEM	0	99,217	0	0	0	99,217
ADMINISTRATIVE EXPENSES	0	1,013,655	0	3,600	0	1,017,255
TAPIA WAREHOUSE	0	4,400	0	0	0	4,400
REVENUES	0	(2,735,468)	0	0	(20,000)	(2,755,468)
TOTAL EXPENSES	145,013	9,307,143	4,853,505	3,600	(20,000)	14,289,261
	A	B	C	D	E	TOTAL

PARTICIPANTS SHARE	ALLOCATION OF EACH GROUP TO PARTICIPANTS											
	%	$	%	$	%	$	%	$	%	$		
U-1 SANITATION DISTRICT	36.3%	52,640	53.1%	5,391,022	40.6%	1,970,523	25.0%	900	82.2%	(16,449)	51.8%	7,398,636
U-2 SANITATION DISTRICT	3.1%	4,495	17.5%	1,776,702	21.2%	1,028,943	25.0%	900	0.0%	0	19.7%	2,811,040
RECYCLED WATER FUND				(664,993)							-4.7%	(664,993)
TOTAL LVMWD	39.4%	57,135	70.6%	6,502,731	61.8%	2,999,466	50.0%	1,800	82.2%	(16,449)	66.8%	9,544,683
TRIUNFO SANITATION DISTRICT	60.6%	87,878	29.4%	2,804,412	38.2%	1,854,039	50.0%	1,800	17.8%	(3,551)	33.2%	4,744,578
TOTAL ALLOCATION	100.0%	145,013	100.0%	9,307,143	100.0%	4,853,505	100.0%	3,600	100.0%	(20,000)	100.0%	14,289,261
	A		B		C		D		E		TOTAL	

GROUP

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D Each participant is allocated an equal share.

E Basis of allocation is each participant's average monthly cash balance.

PARTICIPANT	PROJECTED SEWAGE FLOWS			ALLOCATION OF TOTAL EXPENSES TO PARTICIPANTS		
	MILLION GALLONS PER DAY (MGD)	MILLION GALLONS PER YEAR (MG)	PERCENT BASED ON FLOWS	TOTAL EXP	$ PER MG	%
U-1 SANITATION DISTRICT	2.47	902	40.6%	6,898,478	7,648	48.3%
U-2 SANITATION DISTRICT	1.29	472	21.2%	2,646,205	5,606	18.5%
LVMWD	3.76	1,374	61.8%	9,544,683	6,947	66.8%
TRIUNFO SANITATION DISTRICT	2.32	848	38.2%	4,744,578	5,595	33.2%
TOTAL ALL PARTICIPANTS	6.09	2,222	100.0%	14,289,261	6,431	100.0%
RETURN FLOWS	1.35	494				
WESTLAKE WELLS	0.28	101				
	7.72	2,817				

FISCAL YEAR 2019-20 OPERATING BUDGET

ALLOCATION OF JOINT POWERS EXPENSES TO PARTICIPANTS

EXPENSES (REVENUES)	JPA EXPENSES BY ALLOCATION GROUPS					
SEWER EXPENSE	147,995	0	0	0	0	147,995
TREATMENT RECLAMATION	0	5,877,030	2,986,685	0	0	8,863,715
TREATMENT COMPOSTING	0	3,574,303	1,841,209	0	0	5,415,512
TREATMENT INJECTION	0	170,807	151,230	0	0	322,037
PUMP STATIONS	0	1,379,114	0	0	0	1,379,114
TANKS/RESERVOIR WELLS	0	133,191	0	0	0	133,191
SYSTEM OPERATION	0	47,592	0	0	0	47,592
WATER SYSTEM	0	101,209	0	0	0	101,209
ADMINISTRATIVE EXPENSES	0	1,003,771	0	3,700	0	1,007,471
TAPIA WAREHOUSE	0	4,840	0	0	0	4,840
REVENUES	0	(2,767,396)	0	0	(20,000)	(2,787,396)
TOTAL EXPENSES	147,995	9,524,461	4,979,124	3,700	(20,000)	14,635,280
	A	B	C	D	E	TOTAL

PARTICIPANTS SHARE	ALLOCATION OF EACH GROUP TO PARTICIPANTS											
	%	$	%	$	%	$	%	$	%	$		
U-1 SANITATION DISTRICT	36.3%	53,722	53.1%	5,506,417	41.3%	2,056,378	25.0%	925	82.2%	(16,449)	51.9%	7,600,993
U-2 SANITATION DISTRICT	3.1%	4,588	17.5%	1,814,733	21.0%	1,045,616	25.0%	925	0.0%	0	19.6%	2,865,862
RECYCLED WATER FUND				(656,394)							-4.5%	(656,394)
TOTAL LVMWD	39.4%	58,310	70.6%	6,664,756	62.3%	3,101,994	50.0%	1,850	82.2%	(16,449)	67.0%	9,810,461
TRIUNFO SANITATION DISTRICT	60.6%	89,685	29.4%	2,859,705	37.7%	1,877,130	50.0%	1,850	17.8%	(3,551)	33.0%	4,824,819
TOTAL ALLOCATION	100.0%	147,995	100.0%	9,524,461	100.0%	4,979,124	100.0%	3,700	100.0%	(20,000)	100.0%	14,635,280
	A		B		C		D		E		TOTAL	

GROUP

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PARTICIPANT	PROJECTED SEWAGE FLOWS			ALLOCATION OF TOTAL EXPENSES TO PARTICIPANTS		
	MILLION GALLONS PER DAY (MGD)	MILLION GALLONS PER YEAR (MG)	PERCENT BASED ON FLOWS	TOTAL EXP	$ PER MG	%
U-1 SANITATION DISTRICT	2.54	928	41.3%	7,107,303	7,659	48.6%
U-2 SANITATION DISTRICT	1.29	471	21.0%	2,703,158	5,739	18.5%
LVMWD	3.83	1,399	62.3%	9,810,461	7,012	67.1%
TRIUNFO SANITATION DISTRICT	2.32	847	37.7%	4,824,819	5,696	32.9%
TOTAL ALL PARTICIPANTS	6.15	2,246	100.0%	14,635,280	6,516	100.0%
RETURN FLOWS	1.36	496				
WESTLAKE WELLS	0.30	109				
	7.81	2,851				

Las Virgenes Municipal Water District
and Triunfo Sanitation District
Joint Powers Authority Operations

	FY 14-15	FY 15-16	FY 16-17	FY 17-18 est.	FY 18-19 Budget	FY 19-20 Budget
Wholesale Recycled Water Rates						
Unit charges per Acre Foot delivered.						
Las Virgenes Valley	$242.21	$310.08	$315.53	$311.96	$344.72	$346.65
LVMWD - East/West	373.72	436.96	423.41	423.13	474.69	480.53
Triunfo Sanitation District	373.72	436.96	423.41	423.13	474.69	480.53

Wholesale Recycled Water rates are designed to recover the annual cost of operating the Recycled Water system.
The Las Virgenes Valley rate is lower due to the significant additional electricity costs of operating the East/West pump stations.
Costs of Administration and Depreciation are included, beginning in FY 11-12.

Wholesale Recycled Water Revenue	2,134,678	2,286,663	2,057,700	2,368,539	2,655,468	2,687,396
Pump Stations	1,265,184	1,081,612	1,214,034	1,280,420	1,340,559	1,379,114
Tanks/Reservoirs/Wells	295,275	69,507	117,194	75,601	130,455	133,191
System Operation	48,725	30,622	28,377	26,084	46,435	47,592
Distribution	92,976	54,715	112,984	120,664	99,217	101,209
Administration	125,862	94,756	126,259	108,291	96,902	96,515
Depreciation	879,187	917,757	941,916	917,757	941,916	929,736
Total Recycled Water Costs	2,707,209	2,248,969	2,540,764	2,528,817	2,655,484	2,687,357
Net Income from Wholesale Recycled Water	(572,531)	37,694	(483,064)	(160,278)	(16)	39

Sales						
Las Virgenes Valley	303	263	255	321	321	321
LVMWD - East/West	3,839	3,378	3,043	3,594	3,594	3,594
Triunfo Sanitation District	1,677	1,668	1,627	1,767	1,767	1,767
Total Wholesale Sales - A/F	5,819	5,309	4,925	5,682	5,682	5,682

RW WHOLESALE RATE COMPUTATIONS

FY 2018-19 Budgeted Costs	Total Cost	Base Cost	Add'l Pumping	East-West Cost
Pump Stations	1,340,559	643,764	696,795	
Reservoirs	130,455	130,455		
System Operations	46,435	46,435		
Distribution	99,217	99,217		
RW Operations	1,616,667			
RW Ops/Total JPA Ops	9.5%			
Total JPA Admin	1,021,655			
RW Administration	96,902	96,902		
subtotal:Operations & Admin	1,713,569	1,016,774		
Depreciation FY16-17	941,916	941,916	-	
Total Cost	$ 2,655,485	$ 1,958,690	$ 696,795	
Costs per Acre Foot		$ 344.72	$ 129.97	$ 474.69

FY 2018-19 Estimated Deliveries

	Acre Feet	Rate		
LV Valley	321	$ 344.72	/AF	$ 110,655.12
LVMWD East	1,443	$ 474.69	/AF	$ 684,977.67
LVMWD West	2,151	$ 474.69	/AF	$ 1,021,058.19
Total LVMWD	3,915			$ 1,816,690.98
TSD	1,767	$ 474.69	/AF	$ 838,777.23
	5,682			$ 2,655,468.21

RW WHOLESALE RATE COMPUTATIONS

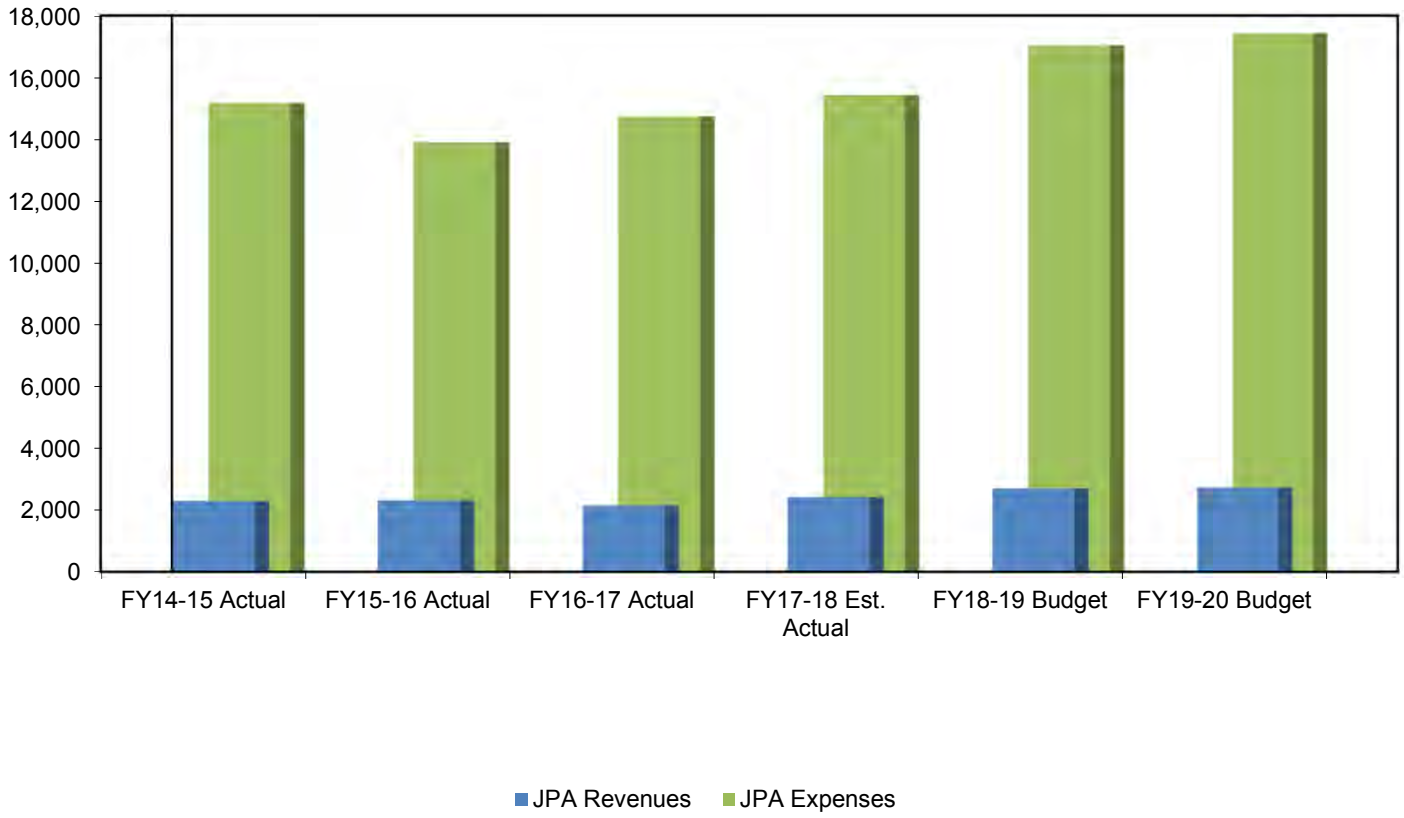
FY 2019-20 Budgeted Costs	Total Cost	Base Cost	Add'l Pumping	East-West Cost
Pump Stations	1,379,114	661,409	717,705	
Reservoirs	133,191	133,191		
System Operations	47,592	47,592		
Distribution	101,209	101,209		
RW Operations	1,661,106			
RW Ops/Total JPA Ops	9.5%			
Total JPA Admin	1,012,311			
RW Administration	96,515	96,515		
subtotal:Operations & Admin	1,757,622	1,039,917		
Est. Depreciation FY17-18	929,736	929,736	-	
Total Cost	$ 2,687,358	$ 1,969,653	$ 717,705	
Costs per Acre Foot		$ 346.65	$ 133.88	$ 480.53

FY 2019-20 Estimated Deliveries

	Acre Feet	Rate		
LV Valley	321	$ 346.65	/AF	$ 111,274.65
LVMWD East	1,443	$ 480.53	/AF	$ 693,404.79
LVMWD West	2,151	$ 480.53	/AF	$ 1,033,620.03
Total LVMWD	3,915			$ 1,838,299.47
TSD	1,767	$ 480.53	/AF	$ 849,096.51
	5,682			$ 2,687,395.98

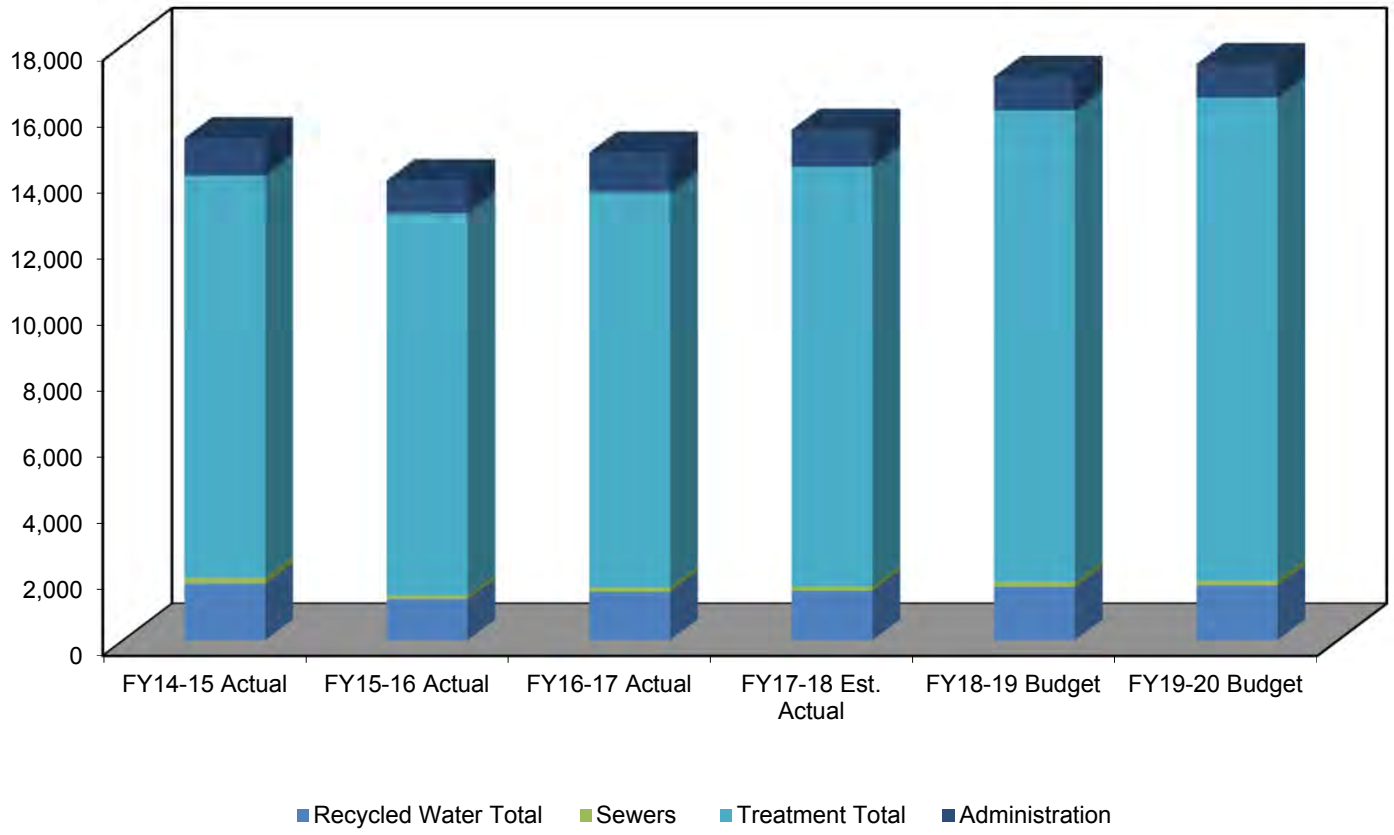
Las Virgenes - Triunfo
Joint Powers Authority
Operations Summary
(Dollars in Thousands)

	FY14-15 Actual	FY15-16 Actual	FY16-17 Actual	FY17-18 Est. Actual	FY18-19 Budget	FY19-20 Budget
JPA Revenues	2,326	2,346	2,168	2,449	2,735	2,767
JPA Expenses	15,189	13,920	14,755	15,441	17,043	17,423
Net Operating Expense	12,863	11,574	12,587	12,992	14,308	14,656



Las Virgenes - Triunfo
Joint Powers Authority
Operating Expense Summary
(Dollars in Thousands)

	FY14-15 Actual	FY15-16 Actual	FY16-17 Actual	FY17-18 Est. Actual	FY18-19 Budget	FY19-20 Budget
Pump Stations	1,276	1,082	1,214	1,280	1,341	1,379
Tank, Res, Wells	295	70	117	76	130	133
System Ops	49	31	28	26	46	48
Distribution	93	55	113	121	99	101
Recycled Water Total	1,713	1,238	1,472	1,503	1,616	1,661
Sewers	195	119	135	127	145	148
Reclamation	7,528	7,158	7,192	7,668	8,635	8,864
Composting	4,308	4,173	4,463	4,733	5,308	5,416
Centrate Treatment	322	243	297	294	318	322
Treatment Total	12,158	11,574	11,952	12,695	14,261	14,602
Administration	1,123	989	1,196	1,116	1,021	1,012
Total JPA Operations	15,189	13,920	14,755	15,441	17,043	17,423



Las Virgenes - Triunfo
Joint Powers Authority
Operations Summary

	FY 14-15 Actual	FY 15-16 Actual	FY 16-17 Actual	FY 17-18 Budget	FY 17-18 Est. Actual	FY 18-19 Budget	FY 19-20 Budget
OPERATING REVENUES							
4235 RW Sales - LVMWD	$1,508,136	$1,557,726	$1,369,024	$1,707,782	$1,620,868	$1,816,691	$1,838,299
4240 RW Sales - TSD	626,542	728,937	688,676	765,442	747,671	838,777	849,097
4245 MWD Incentive - Local Projects	100,331	0	0	0	0	0	0
4505 Other Income from Operations	54,523	41,954	96,197	65,000	65,000	65,000	65,000
4510 Compost Sales	36,698	17,224	14,161	15,000	15,000	15,000	15,000
TOTAL OPERATING REVENUES	**$2,326,230**	**$2,345,841**	**$2,168,058**	**$2,553,224**	**$2,448,539**	**$2,735,468**	**$2,767,396**
SOURCE OF SUPPLY							
5115 Purchased Water - Potable Suppl	136,529	0	34,124	0	0	0	0
OPERATIONS DIVISION EXPENSE							
5400 Labor	1,833,291	1,814,962	1,986,771	1,935,364	1,951,367	2,206,257	2,263,114
5405.1 Electricity	2,547,058	2,227,083	2,101,399	2,470,770	2,382,756	2,438,504	2,509,986
5405.2 Telephone	21,501	31,564	52,977	25,488	46,524	41,998	43,228
5405.3 Natural Gas	23,294	17,631	21,443	16,631	16,914	20,789	21,413
5405.4 Water	11,141	7,022	7,956	9,725	9,582	8,808	9,066
5410 Supplies/Material	58,280	80,525	72,756	75,365	72,642	78,312	79,648
5410.1 Fuel	14,978	6,004	26,208	15,233	22,000	28,445	29,298
5410.5 Ferric Chloride	60,306	56,100	42,204	70,700	27,712	52,870	54,456
5410.6 Defoamer/Deodorant	5,990	0	6,082	0	7,079	4,000	4,120
5410.7 Polymer	114,821	81,706	120,588	119,247	120,000	105,705	108,876
5410.8 Amendment	181,136	200,344	142,893	195,000	89,570	120,000	123,600
5410.9 Alum	14,569	6,205	6,864	25,900	6,786	9,213	9,489
5410.10 Sodium Hypochlorite	243,406	150,971	212,248	160,000	150,792	202,208	208,274
5410.11 Sodium Bisulfite	150,059	110,119	77,498	130,000	102,964	112,559	115,936
5410.13 Aqua Ammonia	20,249	40,318	31,675	50,000	24,250	30,747	31,669
5415 Outside Services	42,275	46,961	57,168	50,097	47,000	57,500	58,400
5417 Odor Control	130,480	72,177	143,703	145,000	141,684	195,000	200,850
5420 Permits and Fee	188,358	181,108	193,347	191,945	170,571	187,765	191,295
5425 Consulting Services	11,582	948	0	170,000	96,859	69,177	4,302
5430 Capital Outlay	16,609	27,790	23,994	37,000	20,000	67,500	65,000
Sub-total	$5,689,383	$5,159,538	$5,327,774	$5,893,465	$5,507,052	$6,037,357	$6,132,020
MAINTENANCE DIVISION EXPENSE							
5500 Labor	1,259,216	1,119,250	1,211,888	1,445,396	1,223,139	1,365,516	1,400,989
5510 Supplies/Material	532,159	585,576	396,570	484,164	388,060	483,500	483,500
5515 Outside Services	362,683	362,494	437,628	313,657	265,200	356,450	341,450
5518 Building Maintenance	108,602	96,566	88,631	116,840	110,000	116,000	116,000
5520 Permits and Fee	768	814	580	500	1,400	500	500
5525 Consulting Services	4,002	0	2,252	0	0	0	0
5530 Capital Outlay	23,670	31,622	45,774	293,640	213,000	25,500	95,000
Sub-total	$2,291,100	$2,196,322	$2,183,323	$2,654,197	$2,200,799	$2,347,466	$2,437,439
INVENTORY EXPENSES							
5536 Inventory Adjustment	12,800	3,102	(2,393)	4,840	4,840	4,400	4,840
Sub-total	$12,800	$3,102	($2,393)	$4,840	$4,840	$4,400	$4,840
PUBLIC INFORMATION							
6602 School Education Program	10,509	9,290	22,535	11,975	20,484	19,770	20,971
6604 Public Education Program	39,331	57,663	70,275	71,835	59,980	67,668	67,722
6606 Community Group Outreach	1,184	220	1,182	6,525	3,594	5,990	6,028
6608 Intergovernmental Coordination	1,842	6,008	4,146	10,618	3,344	5,277	5,298
Sub-total	$52,866	$73,181	$98,138	$100,953	$87,402	$98,705	$100,019
RESOURCE CONSERVATION							
6788 District Sprayfield	254,095	258,114	251,449	311,920	303,017	320,857	321,779
6789 005 Discharge	5,523	3,652	277	380	250	400	400
6785 Watershed Programs	27,504	4,370	60,773	89,474	26,382	46,429	46,594
Sub-total	$287,122	$266,136	$312,499	$401,774	$329,649	$368,196	$369,290

Las Virgenes - Triunfo
Joint Powers Authority
Operations Summary

	FY 14-15 Actual	FY 15-16 Actual	FY 16-17 Actual	FY 17-18 Budget	FY 17-18 Est. Actual	FY 18-19 Budget	FY 19-20 Budget
SPECIALTY EXPENSES							
5700 SCADA Services	68,401	58,619	49,624	142,568	95,592	110,198	114,310
5710.2 Technical Services	1,090	1,228	0	332	0	638	646
5712 Compost Sales/Use Tax	4,549	3,721	2,922	4,000	4,000	4,000	4,000
5715.2 Other Lab Services	147,489	168,185	141,224	153,562	93,894	152,286	156,855
5715.3 Tapia Lab Sampling	140,569	137,910	125,705	137,915	129,885	147,443	151,302
7202 Allocated Lab Expense	351,743	335,237	378,015	411,386	376,267	435,685	447,383
Sub-total	$713,841	$704,900	$697,490	$849,763	$699,638	$850,250	$874,496
ADMINISTRATIVE EXPENSES							
6872 Litigation/Outside Services	219,268	106,211	83,990	50,000	25,000	25,000	25,000
6516 Other Professional Services	20,186	149,719	95,007	200,000	298,040	136,800	137,000
6517 Audit Fees	2,500	3,296	3,395	2,730	3,495	3,600	3,700
7110 Travel/Misc Staff Expense	54	138	248	0	0	0	0
7135.1 Property Insurance	55,181	55,132	56,955	59,073	56,347	58,038	59,779
7135.4 Earthquake Insurance	89,726	88,786	91,466	95,134	90,073	92,775	95,559
7145 Claims Paid	147,000	18,000	122,451	0	0	0	0
7153 TSD Staff Services	4,036	1,804	0	5,000	5,000	5,000	5,000
7155 Other Expense	0	0	54,029	0	0	0	0
6260 Rental Charge - Facility Repl	344,732	336,150	371,357	377,798	351,674	363,316	363,316
7203 Allocated Building Maint	88,082	95,945	83,651	97,010	97,010	107,102	88,804
7225 Allocated Support Services	3,432,606	3,288,672	3,528,201	4,218,645	3,779,639	4,452,208	4,606,605
7226 Allocated Operations Services	1,602,547	1,372,249	1,613,325	1,684,745	1,904,462	2,094,516	2,119,810
Sub-total	$6,005,918	$5,516,102	$6,104,075	$6,790,135	$6,610,740	$7,338,355	$7,504,572
TOTAL EXPENSES	**$15,189,559**	**$13,919,281**	**$14,755,030**	**$16,695,127**	**$15,440,120**	**$17,044,729**	**$17,422,676**
NET OPERATING EXPENSE	**$12,863,329**	**$11,573,440**	**$12,586,972**	**$14,141,903**	**$12,991,581**	**$14,309,261**	**$14,655,280**

Las Virgenes Municipal Water District
Summary of Allocated Internal Service Costs
FY 2017-18 Estimated Actual

Central Service Provider	Total Costs	Direct Allocations	Allocated G&A Costs	Cost Recipient JPA	Total LVMWD Operations	Capital Projects	Internal G&A Allocated/ (Received)	Total Allocations
General Manager	718,942	5,882	724,824	412,447	166,368	7,128	138,881	724,824
General Manager-100% LVMWD	277,400	(12,730)	264,670	-	268,566	-	(3,896)	264,670
Board of Directors	250,601	-	250,601	-	257,012	-	(6,411)	250,601
Board of Directors & GM	1,246,943	(6,848)	1,240,095	412,447	691,946	7,128	128,574	1,240,095
RCPO Administration	402,212	-	402,212	228,868	31,023	-	142,321	402,212
Customer Service Admin	233,144	-	233,144	-	-	-	233,144	233,144
Customer Service Operations	1,529,523	505,095	2,034,618	-	2,305,823	12,513	(283,718)	2,034,618
Meter Service	925,029	-	925,029	-	1,051,555	-	(126,526)	925,029
Customer Service Programs	258,157	11,642	269,799	-	397,026	-	(127,227)	269,799
Resource/Watershed Conservation	429,611	5,882	435,493	-	518,890	57,654	(141,051)	435,493
Public Information	385,314	-	385,314	219,254	41,109	8,552	116,399	385,314
RCPO	4,162,990	522,619	4,685,609	448,122	4,345,426	78,719	(186,659)	4,685,609
Facilities & Operations Admin	361,485	5,882	367,367	209,042	205,066	43,410	(90,152)	367,367
Facilities Maint/Const Admin	167,926	4,105	172,031	97,891	96,257	20,376	(42,493)	172,031
Electrical	179,967	34,988	214,955	122,317	147,739	698	(55,799)	214,955
Maintenance	258,041	116,730	374,771	213,254	126,366	-	35,151	374,771
Building 8 Maintenance	387,192	-	387,192	220,325	-	-	166,867	387,192
Building 7 Maintenance	186,968	(186,968)	-	1	76,204	-	(76,205)	-
Construction	127,743	151,718	279,461	159,025	174,508	-	(54,072)	279,461
Fleet Maintenance	612,749	(612,749)	-	-	-	-	-	-
Water Administration	71,664	1,716	73,380	41,755	52,337	-	(20,712)	73,380
Water Treatment & Production	284,749	99,204	383,953	218,482	256,395	407	(91,331)	383,953
Reclamation Administration	490,127	11,642	501,769	285,523	-	-	216,246	501,769
Laboratory	549,950	(549,950)	-	(1)	354,076	-	(354,075)	-
Wastewater Treatment Facility	194,477	23,284	217,761	123,912	234,258	-	(140,409)	217,761
Composting Facility	122,242	29,167	151,409	86,155	149,215	-	(83,962)	151,409
Planning & Technical Services	843,461	(87,908)	755,553	433,712	63,745	590,415	(332,319)	755,553
Facilities & Operations	4,838,741	(959,139)	3,879,602	2,211,395	1,936,166	655,306	(923,265)	3,879,602
Finance & Administration Admin	1,024,697	-	1,024,697	583,229	203,411	-	238,057	1,024,697
Information Systems	1,303,677	(317,922)	985,755	582,279	122,589	25,504	255,384	985,755
Human Resources	1,355,139	-	1,355,139	771,118	124,796	25,963	433,263	1,355,139
Finance & Accounting	1,187,124	-	1,187,124	675,511	402,245	54,722	54,646	1,187,124
Finance & Administration	4,870,637	(317,922)	4,552,715	2,612,137	853,041	106,188	981,349	4,552,715
Total Allocated G&A Costs	15,119,311	(761,290)	14,358,021	5,684,101	7,826,580	847,340	-	14,358,021
Direct Allocations								
Allocated Laboratory Expenses				376,267	185,325	-	-	561,592
Allocated Ops Bldg Expenses				93,484	93,484	-	-	186,968
Allocated Legal Expenses				-	12,730	-	-	12,730
Total Direct Allocations				469,751	291,539	-	-	761,290
Total all Allocated Costs				6,153,852	8,118,119	847,340	-	15,119,311

Las Virgenes Municipal Water District
Summary of Allocated Internal Service Costs
FY 2018-19 Budget

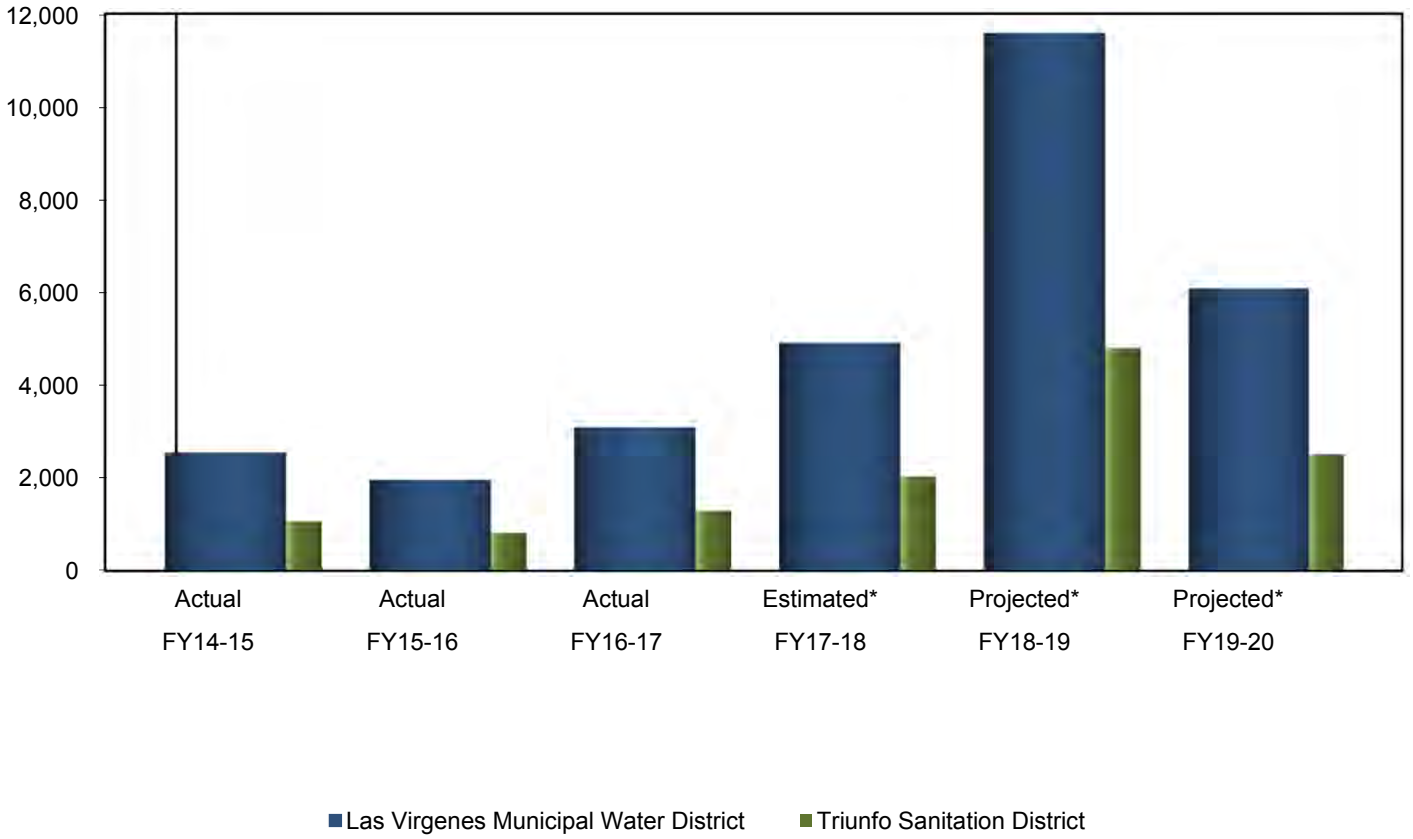
Central Service Provider	Total Costs	Direct Allocations	Allocated G&A Costs	Cost Recipient JPA	Total LVMWD Operations	Capital Projects	Internal G&A Allocated/ (Received)	Total Allocations
General Manager	840,000	6,399	846,399	472,190	200,182	8,578	165,449	846,399
General Manager-100% LVMWD	295,137	(20,000)	275,137	-	280,723	-	(5,586)	275,137
Board of Directors	328,082	-	328,082	-	336,851	-	(8,769)	328,082
Board of Directors & GM	1,463,219	(13,601)	1,449,618	472,190	817,756	8,578	151,095	1,449,618
RCPO Administration	458,236	-	458,236	256,920	36,945	-	164,372	458,236
Customer Service Admin	288,493	-	288,493	-	-	-	288,493	288,493
Customer Service Operations	1,778,611	513,761	2,292,372	-	2,689,622	15,115	(412,364)	2,292,372
Meter Service	1,043,692	-	1,043,692	-	1,202,895	-	(159,203)	1,043,692
Customer Service Programs	298,281	12,665	310,946	-	468,170	-	(157,224)	310,946
Resource/Watershed Conservation	532,565	6,399	538,964	-	640,599	71,178	(172,813)	538,964
Public Information	543,664	-	543,664	304,770	55,676	11,582	171,635	543,664
RCPO	4,943,542	532,825	5,476,367	561,690	5,093,907	97,875	(277,105)	5,476,367
Facilities & Operations Admin	527,232	6,399	533,631	299,189	284,646	60,256	(110,460)	533,631
Facilities Maint/Const Admin	183,784	4,466	188,250	105,545	111,962	23,702	(52,959)	188,250
Electrical	326,624	38,062	364,686	204,470	209,503	512	(49,799)	364,686
Maintenance	322,840	126,986	449,826	252,204	162,997	-	34,625	449,826
Building 8 Maintenance	437,595	-	437,595	245,346	-	-	192,249	437,595
Building 7 Maintenance	214,204	(214,204)	-	-	104,356	-	(104,356)	-
Construction	231,514	165,048	396,562	222,340	230,026	-	(55,804)	396,562
Fleet Maintenance	666,588	(666,588)	-	-	-	-	-	-
Water Administration	78,756	1,866	80,622	45,204	60,969	-	(25,550)	80,622
Water Treatment & Production	272,644	107,921	380,565	213,370	279,408	534	(112,747)	380,565
Reclamation Administration	546,191	12,665	558,856	313,333	-	-	245,523	558,856
Laboratory	637,611	(637,611)	-	-	427,383	-	(427,383)	-
Wastewater Treatment Facility	70,148	25,330	95,478	53,532	211,540	-	(169,594)	95,478
Composting Facility	106,486	31,730	138,216	76,853	169,950	-	(108,587)	138,216
Planning & Technical Services	927,828	(83,925)	843,903	467,865	124,434	643,740	(392,136)	843,903
Facilities & Operations	5,550,045	(1,081,855)	4,468,190	2,499,250	2,377,174	728,743	(1,136,978)	4,468,190
Finance & Administration Admin	1,076,815	-	1,076,815	596,701	215,499	-	264,615	1,076,815
Information Systems	1,730,308	(321,849)	1,408,459	781,244	160,814	33,457	432,945	1,408,459
Human Resources	1,519,323	-	1,519,323	848,367	144,289	30,018	496,649	1,519,323
Finance & Accounting	1,409,182	-	1,409,182	787,281	487,841	65,281	68,780	1,409,182
Finance & Administration	5,735,628	(321,849)	5,413,779	3,013,594	1,008,442	128,755	1,262,988	5,413,779
Total Allocated G&A Costs	17,692,434	(884,480)	16,807,954	6,546,724	9,297,279	963,951	-	16,807,954
Direct Allocations								
Allocated Laboratory Expenses				435,685	214,591	-	-	650,276
Allocated Ops Bldg Expenses				107,102	107,102	-	-	214,204
Allocated Legal Expenses				-	20,000	-	-	20,000
Total Direct Allocations				542,787	341,693	-	-	884,480
Total all Allocated Costs				7,089,511	9,638,972	963,951	-	17,692,434

Las Virgenes Municipal Water District
Summary of Allocated Internal Service Costs
FY 2019-20 Budget

Central Service Provider	Total Costs	Direct Allocations	Allocated G&A Costs	Cost Recipient JPA	Total LVMWD Operations	Capital Projects	Internal G&A Allocated/ (Received)	Total Allocations
General Manager	846,008	6,708	852,716	475,438	203,113	8,704	165,461	852,716
General Manager-100% LVMWD	309,108	(20,000)	289,108	-	294,669	-	(5,561)	289,108
Board of Directors	269,360	-	269,360	-	277,952	-	(8,592)	269,360
Board of Directors & GM	1,424,476	(13,292)	1,411,184	475,438	775,734	8,704	151,308	1,411,184
RCPO Administration	469,786	-	469,786	263,231	37,957	-	168,598	469,786
Customer Service Admin	294,478	-	294,478	-	-	-	294,478	294,478
Customer Service Operations	1,808,311	539,025	2,347,336	-	2,751,105	15,325	(419,094)	2,347,336
Meter Service	957,303	-	957,303	-	1,121,106	-	(163,803)	957,303
Customer Service Programs	306,014	13,276	319,290	-	480,303	-	(161,013)	319,290
Resource/Watershed Conservation	548,022	6,708	554,730	-	659,110	73,234	(177,614)	554,730
Public Information	550,214	-	550,214	308,250	56,394	11,732	173,839	550,214
RCPO	4,934,128	559,009	5,493,137	571,481	5,105,974	100,290	(284,608)	5,493,137
Facilities & Operations Admin	541,146	6,708	547,854	306,973	292,528	61,924	(113,572)	547,854
Facilities Maint/Const Admin	188,694	4,682	193,376	108,351	115,184	24,383	(54,542)	193,376
Electrical	333,810	39,899	373,709	209,401	215,229	513	(51,434)	373,709
Maintenance	300,402	133,114	433,516	242,907	161,073	-	29,536	433,516
Building 8 Maintenance	424,644	-	424,644	237,937	-	-	186,707	424,644
Building 7 Maintenance	177,609	(177,609)	-	1	105,158	-	(105,159)	-
Construction	224,285	173,013	397,298	222,615	231,955	-	(57,272)	397,298
Fleet Maintenance	698,759	(698,759)	-	-	-	-	-	-
Water Administration	80,903	1,957	82,860	46,428	62,806	-	(26,374)	82,860
Water Treatment & Production	279,341	113,129	392,470	219,909	288,174	551	(116,163)	392,470
Reclamation Administration	560,848	13,276	574,124	321,558	-	-	252,566	574,124
Laboratory	654,459	(654,459)	-	-	440,795	-	(440,795)	-
Wastewater Treatment Facility	72,144	26,553	98,697	55,303	218,239	-	(174,846)	98,697
Composting Facility	109,164	33,261	142,425	79,164	175,167	-	(111,906)	142,425
Planning & Technical Services	960,948	(86,680)	874,268	484,587	128,472	664,639	(403,430)	874,268
Facilities & Operations	5,607,156	(1,071,915)	4,535,241	2,535,134	2,434,780	752,010	(1,186,684)	4,535,241
Finance & Administration Admin	1,074,436	-	1,074,436	600,541	221,826	-	252,068	1,074,436
Information Systems	1,844,654	(339,146)	1,505,508	835,139	169,074	35,174	466,120	1,505,508
Human Resources	1,618,605	-	1,618,605	903,468	152,275	31,680	531,182	1,618,605
Finance & Accounting	1,442,054	-	1,442,054	805,212	499,413	66,815	70,614	1,442,054
Finance & Administration	5,979,749	(339,146)	5,640,603	3,144,361	1,042,589	133,669	1,319,985	5,640,603
Total Allocated G&A Costs	17,945,509	(865,344)	17,080,165	6,726,414	9,359,077	994,673	-	17,080,165
Direct Allocations								
Allocated Laboratory Expenses				447,383	220,352	-	-	667,735
Allocated Ops Bldg Expenses				88,804	88,805	-	-	177,609
Allocated Legal Expenses				-	20,000	-	-	20,000
Total Direct Allocations				536,187	329,157	-	-	865,344
Total all Allocated Costs				7,262,601	9,688,234	994,673	-	17,945,509

Las Virgenes - Triunfo
Joint Powers Authority
Capital Improvement Projects
Annual Expenditures
(Dollars in Thousands)

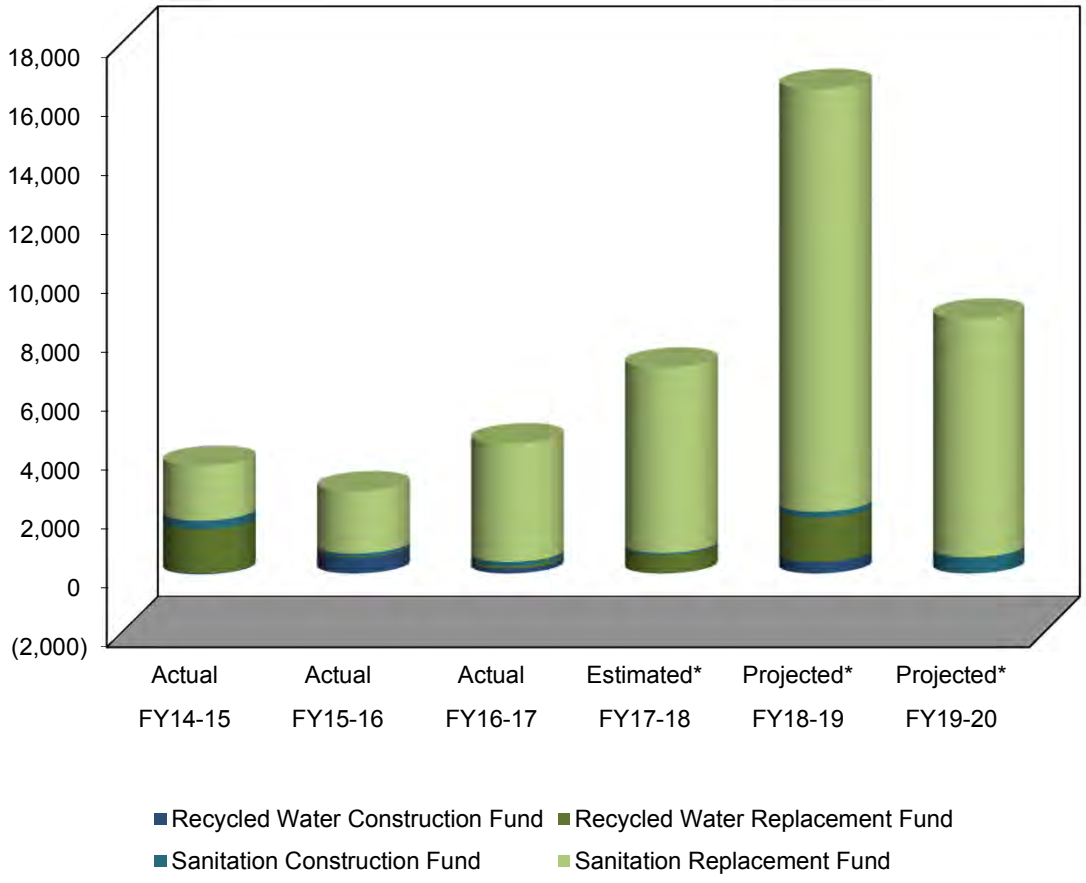
	FY14-15 Actual	FY15-16 Actual	FY16-17 Actual	FY17-18 Estimated*	FY18-19 Projected*	FY19-20 Projected*
Las Virgenes Municipal Water District	2,582	1,987	3,125	4,939	11,587	6,109
Triunfo Sanitation District	1,075	827	1,308	2,057	4,825	2,544
	3,657	2,814	4,433	6,996	16,412	8,653



*Estimated and Projected expenditures represent working capital requirements for each fiscal year.

Las Virgenes - Triunfo
Joint Powers Authority
Capital Improvement Projects
Annual Expenditures
(Dollars in Thousands)

	FY14-15 Actual	FY15-16 Actual	FY16-17 Actual	FY17-18 Estimated*	FY18-19 Projected*	FY19-20 Projected*
Recycled Water Construction Fund	(25)	543	166	3	395	-
Recycled Water Replacement Fund	1,514	33	85	644	1,521	-
Sanitation Construction Fund	295	108	144	56	197	555
Sanitation Replacement Fund	1,873	2,130	4,038	6,293	14,299	8,098
	3,657	2,814	4,433	6,996	16,412	8,653



*Estimated and Projected expenditures represent working capital requirements for each fiscal year.

JPA
Capital Improvement Projects Budget
FY18-19 and FY19-20

Job #	Title	Project Status	Estimated Carryforward June 30, 2018	FY18-19 New Appropriations	FY18-19 Project Budget	FY19-20 New Appropriations
10564	Centrate Equalization Tank	Continuing	$296,145	$0	$296,145	$0
10565	Rancho Las Virgenes Digester Cleaning and Repair	Continuing	$160,428	$0	$160,428	$0
10567	Programmable Logic Controller Upgrades	Continuing	$332,850	$0	$332,850	$376,700
10608	Rancho Amendment Bin and Conveyance Modification Project	Continuing	$187,574	$1,260,000	$1,447,574	$0
10611	Tapia Duct Bank Infrastructure Upgrade	Continuing	$66,000	$160,000	$226,000	$0
10619	Summer Season 2013 TMDL Compliance	Continuing	$50,240	$440,000	$490,240	$2,220,000
10626	Process Air Improvements	Continuing	$1,174,418	$2,119,000	$3,293,418	$0
10629	Canyon Oaks Park RW Main Extension	Continuing	$394,876	$0	$394,876	$0
10635	Pure Water Project Las Virgenes-Triunfo	Continuing	$618,781	$4,500,000	$5,118,781	$3,500,000
10653	Tapia Rehab FY17-18	Continuing	$1,459,851	$0	$1,459,851	$0
10654	Hilton Foundation Solar Carport System	Continuing	$298,605	$0	$298,605	$0
60033	Pavement Restoration Rancho	New	$0	$0	$0	$533,320
70003	Rancho Reliability Improvements	Annual	$0	$100,000	$100,000	$100,000
70008	Tapia Water Reclamation Facility Reliability Improvements	Annual	$0	$100,000	$100,000	$100,000
70011	Tapia Sluice Gate and Drive Replacement	New	$0	$556,600	$556,600	$212,800
99972	Primary Effluent Equalization	New	$0	$0	$0	$100,000
99975	A/B Bus Electrical Modification	New	$0	$100,000	$100,000	$0
201801	Cordillera Tank Rehabilitation	New	$0	$1,201,267	$1,201,267	$0
201803	Calabasas Park Recycled Water Main Extension	New	$0	$320,000	$320,000	$0
201806	Tapia Headworks White Room Floor Plate Repair and Steel Framing Replacement	New	$0	$55,000	$55,000	$0

JPA
Capital Improvement Projects Budget
FY18-19 and FY19-20

Job #	Title	Project Status	Estimated Carryforward June 30, 2018	FY18-19 New Appropriations	FY18-19 Project Budget	FY19-20 New Appropriations
201807	Rancho LV Storm Water Diversion Structure Replacement	New	$0	$30,000	$30,000	$0
201808	Tapia Effluent Pump Station 4160 V Feeder Relocation	New	$0	$0	$0	$100,000
201810	Tapia Tertiary Filters Rehabilitation	New	$0	$0	$0	$60,000
201812	Develop Tour Seating Area at Tapia & Fish Tank Removal	New	$0	$25,000	$25,000	$0
201813	Centrate 20-Inch Valve Repair	New	$0	$150,000	$150,000	$0
201814	Tapia Building Access Control	New	$0	$0	$0	$50,000
201833	Rancho Las Virgenes Digester Cleaning and Repair	New	$0	$225,000	$225,000	$1,300,000
201835	Rancho Las Virgenes: FOG Receiving Facilities	New	$0	$30,000	$30,000	$0
Total CIP Budget			$5,039,768	$11,371,867	$16,411,635	$8,652,820

May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Tapia Water Reclamation Facility Summer Season Waste Load Allocation Compliance Study: Selection of Preferred Method

SUMMARY:

On November 6, 2017, the JPA Board accepted a proposal from Stantec Consulting Services, Inc., to perform the Tapia Water Reclamation Facility Summer Season Waste Load Allocation Compliance Study. The study is one of the requirements of the 2017 Tapia NPDES Permit. The objective of the study is to evaluate options and recommend a method to achieve compliance with the future summer season permit limits of 1.0 mg/L total nitrogen and 0.1 mg/L total phosphorous for discharges to Malibu Creek. A report on the selected method to achieve compliance is due to the Los Angeles Regional Water Quality Control Board by May 16, 2018.

Attached is a draft of the Technical Memorandum (TM) for the compliance study. The report will form the basis for a preliminary design report and CEQA determination to be completed by Stantec, which was also included in their scope of work. The TM presents five different methods to achieve compliance and evaluates them based on key criteria including costs. Four of the methods involve further treatment of Tapia's final recycled water effluent, while one analyzed the treatment of potable water through breakpoint chlorination for discharge to Malibu Creek.

Of the five methods analyzed, the treatment and discharge of potable water to Malibu Creek provided the best water quality reliability, ease of operation and most cost-effective solution. The other four methods relied upon physiochemical and biological processes, which are costly and difficult to operate seasonally.

RECOMMENDATION(S):

Select breakpoint chlorination and discharge of potable water to Malibu Creek as the preferred method to achieve compliance with the summer season waste load allocation for the Tapia Water Reclamation Facility, and authorize staff to finalize the Technical Memorandum for the Tapia Water Reclamation Facility Summer Season Waste Load Allocation Compliance Study.

FISCAL IMPACT:

No

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

There is no immediate financial impact associated with selection of the method of compliance. The adopted Fiscal Year 2017-18 JPA Budget provided funding for this work in the amount of $200,000, which is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District.

DISCUSSION:

In June 2017, the Los Angeles Regional Water Quality Control Board approved a new NPDES Permit for the Tapia Water Reclamation Facility. New seasonal limits were established for the concentrations of total nitrogen (TN) and total phosphorous (TP) discharged to Malibu Creek. The winter season (November 16th through April 14th) limits of 4.0 mg/L TN and 0.20 mg/L TP become effective on November 16, 2030. The JPA's plan for compliance with the winter season TMDL nutrient limits will be achieved through the Pure Water Project Las Virgenes-Triunfo.

Tapia is prohibited from discharging to Malibu Creek from April 15th until November 15th each year. However, there are three specific exceptions to the discharge prohibition. One of these exceptions is a requirement to augment flow in Malibu Creek such that 2.5 cfs of maximum total flow is measured at the downstream Los Angeles County Gauging Station F-130-R. The requirement is intended to sustain the habitat for endangered fish species (steelhead trout) during dry periods. To comply with this requirement, staff regularly monitors the flow at the gauging station and, when the flow drops below 2.5 cfs, Tapia's effluent is introduced into the creek in increasing increments until the desired flow at the gauging station is reached. The maximum total volume of water released for flow augmentation was 160 MG in 2017.

The summer season (April 15th through November 15th) limits of 1.0 mg/L TN and 0.10 mg/L TP become effective on May 16, 2022. In February 2016, MWH (now Stantec) was engaged to prepare a TM evaluating three treatment options that could be implemented to meet the new summer season requirements. The TM identified the use of potable water for creek augmentation as the preferred alternative. The TM also discussed the treatment of potable water by breakpoint chlorination before discharge because imported water from the State Water Project can exceed the TN limit for discharge.

Stantec expanded on the 2016 TM and analyzed five treatment methods that would meet the summer season nutrient requirements. The following five methods were examined:

1. Membrane bioreactor (MBR) and reverse osmosis (RO) treatment of Tapia's tertiary-treated effluent
2. Micro/ultrafiltration (MF/UF), reverse osmosis (RO) and ion exchange (IX) treatment of Tapia's tertiary-treated effluent
3. Breakpoint chlorination and discharge of potable water
4. Membrane bioreactor (MBR) and reverse osmosis (RO) treatment of Tapia's secondary

treated effluent.
5. Biologically active filtration (BAF), micro/ultrafiltration (MF/UF) and reverse osmosis (RO) treatment of Tapia's tertiary-treated effluent

The alternatives were evaluated using the following six criteria:

1. Ease of seasonal operation
2. Performance reliability for permit compliance
3. Operational complexity/familiarity
4. Construction cost
5. Operation and maintenance cost
6. Environmental and community impacts

The cost of purchasing potable water for discharge to Malibu Creek was not included in the analysis because potable water is already purchased to augment the recycled water system during the summer months and discharging potable water to the creek makes more tertiary-treated effluent available for the recycled water system, offsetting the need for potable supplement.

The recommended method is breakpoint chlorination and discharge of potable water to Malibu Creek. This method received the highest score in all six of the evaluation criteria. The other compliance methods did not score as well because of the high cost and difficulty of seasonal operation. The biological and membrane processes are best operated continuously, and summer season augmentation is seasonal. The TM estimated the construction cost for breakpoint chlorination and discharge of potable water at $1,000,000 with annual operation and maintenance costs of $7,200. The other alternatives were estimated to be several times the cost.

Prepared by: Brett Dingman, Water Reclamation Manager

ATTACHMENTS:

Draft Technical Memo for Summer Season Waste Load Allocation Compliance Study

To:	Brett Dingman, P.E. Veronica Hurtado Las Virgenes Municipal Water District	From:	James Borchardt, PE Zakir Hirani, PE Tyler Hadacek, PE Kyleen Marcella, EIT
Title:	Compliance Method Study	Date:	March 16, 2018

1. INTRODUCTION

The Las Virgenes-Triunfo Joint Powers Authority (JPA) own and operate the Tapia Water Reclamation Facility (Tapia) that discharges its treated effluent for part of the year to Malibu Creek. Tapia currently treats approximately 7 million gallons per day (MGD) of wastewater, which is either reused or sent to the Los Angeles River (Outfall 005), Malibu Creek (Outfall 001, 002, 003), or to JPA-operated spray irrigation fields. Reuse of 60-70% of the tertiary effluent produced annually is achieved through an extensive recycled water system. Although the facility is permitted for a capacity of 12 MGD, planning efforts over the last 10 years related to nutrient management have considered 12 MGD as the maximum required capacity for the foreseeable future.

Discharge to Malibu Creek and the Los Angeles River are regulated under NPDES permit CA0056014 issued by the Los Angeles Regional Water Quality Control Board (RWQCB) in 2017. According to Tapia's NPDES permit, discharge of treated water to Malibu Creek is allowed from November 16th to April 14th each year, with the rest of the year referred to as the prohibition period. During the prohibition period, discharges are only allowed for emergency situations (where there is a pipe break or other malfunction in infrastructure), for extreme wet weather flows, or for the purpose of maintaining minimum flows in Malibu Creek as set forth in the NPDES guidelines (augmentation flows). From November 16th through April 14th, excess Tapia flows not consumed by the JPA's recycled water customers have been discharged to one of the three other outfalls, with the majority going to the Malibu Creek outfalls.

Past water quality requirements for discharge to Malibu Creek included monthly limitations for nitrogen compounds of 3.1 mg/L-N ammonia and 8 mg/L-N nitrate plus nitrite. Monthly limitations for total phosphorous was 3 mg/L. New, more stringent nutrient summertime requirements of 1.0 mg/L total nitrogen (TN) and 0.1 mg/L total phosphorus (TP) have been implemented as the Total Maximum Daily Loads for Nutrients in the Malibu Creek Watershed by the United States Environmental Protection Agency, Region 9.

1.1. BACKGROUND

The JPA Board is moving forward with the "Pure Water Project Las Virgenes – Triunfo" in order to maximize beneficial reuse of the Tapia WRF's effluent. This will decrease discharge to Malibu Creek during the wintertime and shoulder periods of the year. However, Tapia WRF will still be required to augment flows to Malibu Creek such that 2.5 cubic feet per second (cfs) of flow is maintained at gauging station F-130-R that meets the stringent TN and TP discharge limits during the summer season.

Due to the potential of low TN and TP limits being implemented for the Malibu Creek discharge, The JPA requested Stantec in 2016 to prepare a technical memorandum (TM), *Treatment and Operations Scenarios for Meeting Lower Nutrient Discharge Limits for the Augmentation Flow to the Malibu Creek*, summarizing various options to meet these limits. Stantec evaluated two different treatment options and a potable water augmentation option. This Study expands on those three options and includes two additional treatment options for evaluation.

1.2. OBJECTIVES

The purpose of this TM is to evaluate five different options to meet TN and TP limits for the Malibu Creek augmentation flow of up to 2.5 cfs (1.6 MGD). Five different options with corresponding design criteria and cost estimates are discussed in this TM; four of these options include treating the Tapia WRF effluent (primary or secondary) to a higher standard while the fifth option analyzes use of imported potable water from Metropolitan Water District of Southern California (Metropolitan) for augmenting Malibu Creek flows. Evaluation criteria were defined to compare the results and determine the optimal option to meet LVMWD's goal.

2. APPROACH

Figure 1 presents the study approach for evaluation and selection of compliance alternatives for augmenting Malibu Creek flow. The evaluation and selection of alternatives was conducted in five major steps. Each of these steps is discussed in detail in the following sections.

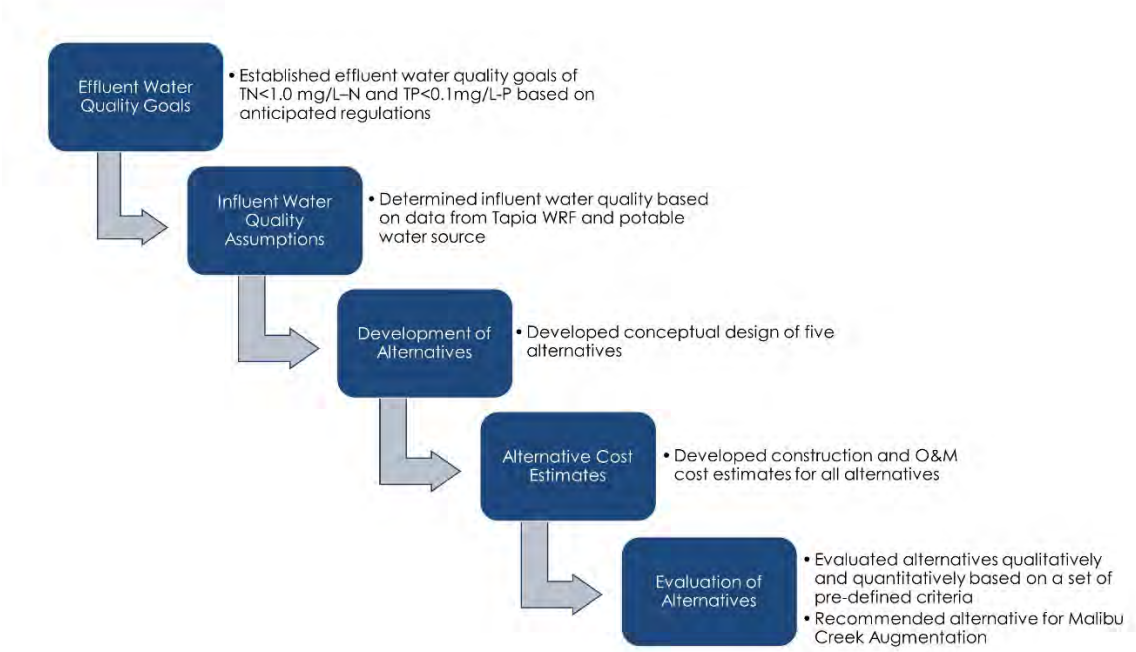


Figure 1 – Study Approach

2.1. EFFLUENT WATER QUALITY AND FLOW GOALS

The proposed TMDLs of 1.0 mg/L TN and 0.1 mg/L TP in the Malibu Creek Watershed were the basis for the development of process treatment train alternatives. The discharge permit requires a minimum of 2.5 cfs constant flow in the creek. If LVMWD has to supplement the entire creek for the entire permit period (April 15th – November 15th), this would result in a maximum volume of 345 MG for augmentation. However, historical records have not indicated that this is a realistic expectation for the near future. For the years 2007-2009, releases were under 10 MG. For the years 2010-2012 no releases were required. Between 2013 and 2017, LVMWD released much greater amounts of augmentation flow to Malibu Creek than in previous years due to drought in Southern California, but still below the total expected maximum. Since 2007, the maximum amount released in a single year to meet endangered species flow requirements was approximately 160 MG, which occurred in 2017. The maximum flow released in a single month during that period was in October 2016 at 42.4 MG. Historical augmentation flows to Malibu Creek are shown in **Table 1**.

Table 1 – Historical Augmentation Flow Released to Malibu Creek

	Augmentation Volume (MG)										
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
April 15th-30th	0	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	2.0	0.0	0.0	0.0	0.0
June	0	0	0	0	0	0	6.3	5.9	3.5	0.0	0.1
July	0	0	0.92	0	0	0	15.4	13.3	11.7	0.0	26.6
August	0	0	0	0	0	0	14.7	16.8	17.2	0.1	37.8
September	0.55	0.58	5.67	0	0	0	23.5	17.7	17.5	18.0	40.5
October	0	0	2.58	0	0	0	15.9	17.0	18.4	42.4	41.7
November 1st-14th	0	0	0	0	0	0	6.2	8.3	8.2	19.2	12.7
Total Flow (MG)	**0.55**	**0.58**	**9.17**	**0**	**0**	**0**	**84.1**	**78.9**	**76.4**	**79.7**	**159.2**
										Average Augmented Volume (MG) 2007-2017	**44.4**

Based on maximum augmentation flows experienced from 2007 to 2017, this analysis assumed approximately 160 MG of water per year released to Malibu Creek for cost estimating purposes.

2.2. INFLUENT WATER QUALITY ASSUMPTIONS

Influent water quality parameters used in the development of treatment alternatives are based on data obtained from Tapia WRF and sampling of the nearby potable water source; these parameters are summarized in **Table 2**. All values are median values obtained from LVMWD provided data, except where noted otherwise. Historical data from Tapia WRF is from 2014 to 2017. Potable water quality is based on water quality from Jensen WTP for Ammonia and Nitrate from 2014 to 2015, and sampling from the distribution system at nearby locations to Tapia WRF for TN and TP from four samples (two taken in Jan and Feb 2016 and two taken in Feb 2018). Additional potable water sampling and analysis is currently taking place to provide more data for TN and TP.

Table 2 – Influent Water Quality for Various Treatment Alternatives

Parameter	Tapia WRF Primary Effluent	Tapia WRF Secondary Effluent	Metropolitan Potable Water
Ammonia (mg/L-N)	32.6	1.4	0.5
Nitrate (mg/L-N)	0	5.4[1]	0.7
Total Nitrogen (mg/L)	43.5[2]	7.8	1.2
Total P (mg/L)	6.8	2.6	<0.1

1. Secondary effluent median nitrate concentration is calculated as 5.4 mg/L-N based on median value of 7.8 mg/L TN, 1.4 mg/L NH_3-N, and an assumed 1.0 mg/L organic nitrogen. Nitrate concentration of 10 mg/L-N was used for modeling of tertiary biological processes for conservatism.

2. Primary effluent TN is estimated based on median ammonia and typical WW fraction of NH_3-N:TKN-N of 0.75:1.0

2.3. DEVELOPMENT OF ALTERNATIVES

Previous planning efforts had identified three alternatives for achieving seasonal compliance. These alternatives were evaluated in greater depth along with two additional alternatives (4 and 5), as follows:

1. Tertiary Membrane Bioreactor (MBR) + Reverse Osmosis (RO)
2. Microfiltration/Ultrafiltration (MF/UF) + RO + Ion Exchange (IX)
3. Breakpoint Chlorination of Potable Water (PW)
4. Secondary MBR + RO
5. Biologically Active Filtration (BAF) + MF/UF + RO

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All alternatives were designed to produce treated water flow of 2.5 cfs (1,123 gpm/1.6 MGD) with treated water TN and TP concentrations of less than 1.0 and 0.1 mg/L, respectively. Each alternative is described in detail in **Section 3**.

2.4. ALTERNATIVE COST ESTIMATES

The initial step for determining the cost estimates for the various alternatives was the compilation of construction and O&M costs for each unit process. The cost estimates developed during this study are Class 5 estimates and have a confidence level of -50% to +100%. Cost estimates for each alternative are summarized in **Section 4**.

Construction costs were developed for each process alternative by accounting for the following items:

- Construction Costs
  - Site work
  - Canopy
  - Concrete
  - Pipeline
  - Process Equipment
- Electrical and I&C
- Mechanical Installation
- Overhead Costs
- Contingencies
- Engineering/Legal/Admin Fees

The principal components for the O&M costs were as follows:

- Equipment Power Consumption
- Chemicals including
  - membrane cleaning chemicals for MBR, MF/UF and RO,
  - acid and antiscalant for RO,
  - carbon source for biological processes
    (note that carbon addition required for denitrification was assumed to be the same for alternatives that use secondary or tertiary biological processes since theoretically overall carbon consumption i.e. wastewater carbon plus supplemental carbon, should be same to achieve the same RO feed water nitrate concentration for these alternatives)
  - sodium hypochlorite and sodium bisulfite for breakpoint chlorination
- Consumables including
  - replacement of membranes,
  - imported potable water for breakpoint chlorination, and
  - Salt cost for IX resin regeneration
- Maintenance – 1% of the total construction cost and adjusted for operation of 6 months per year.
- Water – since potable water is already purchased to supplement the recycled water system during summer months, there is no net change in potable water purchases, and no cost is assumed, for any of the alternatives.
- Secondary Treatment Cost Savings – Secondary MBR would provide similar secondary treatment to what Tapia WRF already produces and would not be an additional cost to current operations. Therefore, the secondary treatment cost was removed from the O&M costs of Alternative 4 so that all costs were compared for tertiary treatment and beyond.

For simplicity, all alternatives are assumed to be constructed at Tapia WRF and operated by existing Tapia WRF staff without the need for additional labor.

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2.5. EVALUATION OF ALTERNATIVES

After conceptual design and cost development, each process alternative was comparatively assessed using a set of evaluation criteria including:

- Ease of Seasonal Operations
- Performable Reliability for Permit Compliance
- Operational Complexity/Familiarity
- Construction Cost
- Operations and Maintenance Cost
- Environmental and Community Impacts

Each alternative was assessed against established criterion and given a numeric score, allowing for a relative comparison. The alternatives were then ranked based upon the combined scores for each alternative. The highest ranking alternative represents the recommended approach for implementation and CEQA analysis.

3. DESCRIPTION OF ALTERNATIVES

This section describes the five alternatives that were developed to meet the TN and TP goals for discharge to Malibu Creek. The flows and effluent quality used to design each process are summarized in **Table 3**.

Table 3 – Water Quality Projections for Unit Processes

	Alternative	Effluent (mg/L)	Secondary MBR	Tertiary MBR	BAF	MF/UF	RO	IX (blended effluent)	Breakpoint Chlorination
1	Tertiary MBR + RO	TN	--	<4.5	--	--	<1	--	--
		TP	--	2.2	--	--	<0.1	--	--
2	MF + RO + IX	TN	--	--	--	10.5	<4	<1	--
		TP	--	--	--	3.6	<0.1	<0.1	--
3	Breakpoint Chlorination	TN	--	--	--	--	--	--	<1
		TP	--	--	--	--	--	--	<0.1
4	Sec MBR + RO	TN	<4.5	--	--		<1	--	--
		TP	2.2	--	--		<0.1	--	--
5	BAF + MF + RO	TN	--	--	<4.5	<4.5	<1	--	--
		TP	--	--	2.2	2.2	<0.1	--	--

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3.1. ALTERNATIVE 1 – TERTIARY MBR + RO

Alternative 1 uses tertiary MBR and RO processes to meet effluent water quality goals. Considering that the RO process will only achieve 80% removal of nitrogen species conservatively, a biological process upstream of the RO system will be necessary to achieve the TN limit of 1.0 mg/L. A two-stage tertiary MBR process consisting of pre-anoxic and aerobic/membrane basins, followed by RO, can be utilized to achieve the required TN and TP limits.

Figure 2 below shows the process schematic of the treatment train for Alternative 1. Since Tapia produces nitrified effluent, the secondary effluent will be fed to a pre-anoxic zone for denitrification. Due to absence of a biodegradable carbon in the secondary effluent, methanol (or an alternative carbon source) will be added to the pre-anoxic zone at a rate of 75 gpd to achieve effluent nitrate concentrations of <0.5 mg/L-N. A total of eight membrane cassettes will be required to treat a target influent flow-rate of 3.00 cfs (1.9 MGD), which will be required to achieve a product (RO permeate) flow-rate of 2.50 cfs (1.6 MGD).

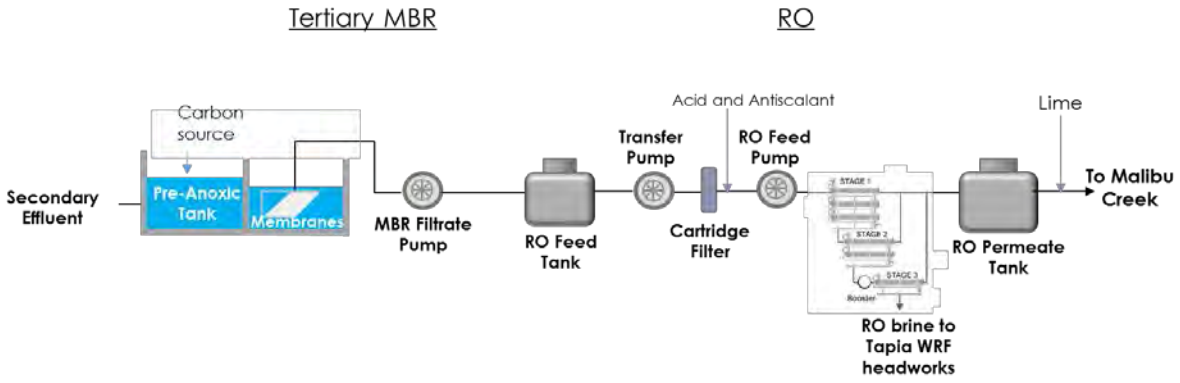

Figure 2 – Process Schematic for Alternative 1

The MBR effluent will be fed to the RO system which will achieve a high degree of phosphorus removal (<0.1 mg/L-P) and lower the effluent TN concentration to <1 mg/L. Sulfuric acid and antiscalant will be added to the RO feed to minimize calcium phosphate ($CaPO_4$) and calcium carbonate ($CaCO_3$) scaling. Supplemental disinfection will not be necessary downstream of RO to meet total coliform limits since RO will effectively remove bacteria. However, chlorine will be used periodically to clean the RO permeate tank to ensure no biofilm develops inside the tank. This cleaning should be scheduled to avoid flushing the RO system with permeate from this tank at the same time so that chlorinated water does not come in contact with the RO membranes. The RO system will be designed as a 3-stage system with a total recovery of 85%. Key process design parameters for Alternative 1 are found in **Appendix A**. It is estimated that a footprint of 7,000-8,000 ft^2 will be required for Alternative 1.

3.2. ALTERNATIVE 2 – MF/UF + RO +IX

Alternative 2 consists of MF/UF, RO and IX. The absence of a biological process in this train provides an advantage of relatively quicker start-ups and shutdowns compared to Alternative 1. Rapid startup/shutdown is particularly beneficial to seasonally operated systems. The MF/UF system will provide required pretreatment for the RO system with respect to particulate removal. The RO system will provide approximately 80% removal of nitrogen species and almost complete removal of phosphate (<0.1 mg/L). The residual nitrate in the RO permeate (<1.6 mg/L-N) will be removed by an IX process downstream of the RO, thereby achieving the final effluent TN and TP goals of 1.0 and 0.1 mg/L, respectively. Only 50% of the RO permeate will be treated using ion-exchange (560 gpm) and blended with the remaining stream to meet the TN and TP goals of 1.0 mg/L and 0.1 mg/L respectively. **Figure 3** shows the process schematic of the treatment train. Key process design parameters for Alternative 2 are shown in **Appendix A**. It is estimated that the Alternative 2 will require approximately 6,000-7,000 ft^2 of space.

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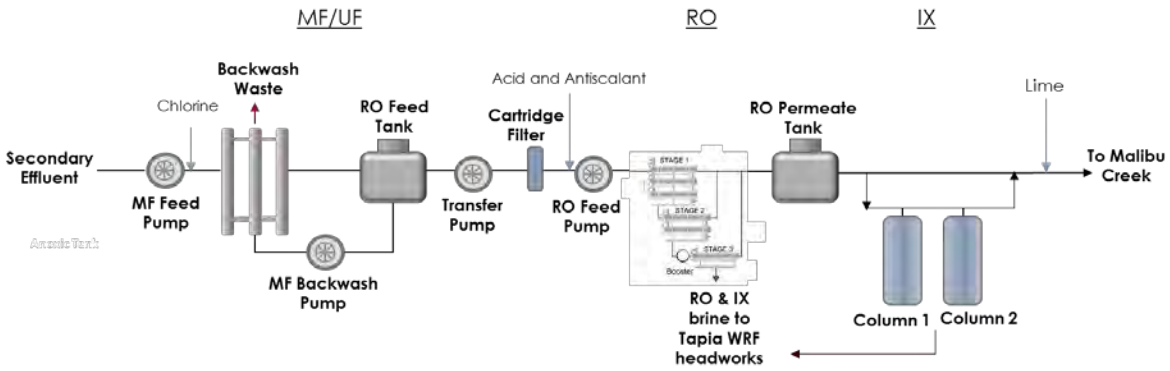

Figure 3 – Process Schematic for Alternative 2

3.3. ALTERNATIVE 3 – BREAKPOINT CHLORINATION OF POTABLE WATER

Alternative 3 provides augmentation flow for Malibu Creek using potable water (**Figure 4**) from the LVMWD distribution system, which originates at Metropolitan Water District's Jensen Water Treatment Plant. Recent sampling of the source water showed that the total phosphorus concentration in the water is already less than <0.1 mg/L but there is small amount of ammonia and nitrate/nitrite causing the TN to occasionally exceed 1 mg/L. Removal of ammonia will be necessary to consistently meet the TN goal and therefore, breakpoint chlorination for ammonia nitrogen removal will be required. For a maximum flow of 2.5 cfs and an estimated hydraulic retention time (HRT) of 20 minutes, a 37,500 gallon chlorine contact tank would be required. The estimated length of pipe required to convey potable water to the tank and then from the tank to the creek is approximately 1,000 ft. If this alternative is selected, bench scale testing should be performed to develop the site-specific breakpoint chlorination curve and determine a more accurate HRT (may range from 5-30 minutes) to optimize the contact tank sizing and dosage requirements. This option requires the addition of sodium hypochlorite for chlorination and sodium bisulfite for dechlorination before the water is discharged into Malibu Creek.

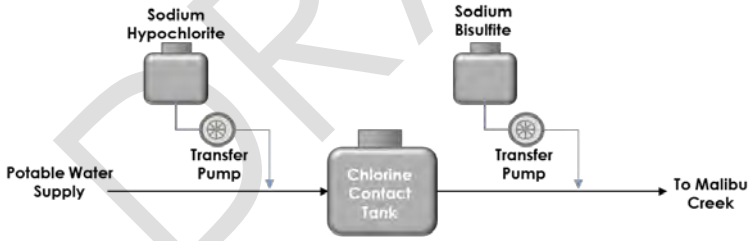

Figure 4 – Process Schematic for Alternative 3

A review of historical records of Metropolitan's Jensen Water Treatment Plant treated water quality for the period 2014-2015 shows a median nitrate concentration of 0.7 mg/L-N and average ammonia concentration of 0.5 mg/L-N. Based on these concentrations, breakpoint chlorination to remove the ammonia would be necessary to bring the potable water into compliance with the TN limit of <1.0 mg/L. However, recent water quality sampling results conducted by LVMWD have shown nitrate at 0.4 mg/L-N and ammonia at 0.4 mg/L-N in the potable supply. This indicates that breakpoint chlorination may not always be required, however the addition of sodium bisulfite for dechlorination must still be practiced. The sampled TP results have been consistently below 0.1 mg/L, as shown in **Table 4**, and therefore it is assumed that no additional treatment process is required for TP removal.

Table 4 – TP Results from Sampling of Potable Water Supply

Sample Date	TP Concentration (mg/L)
2/5/2018	0.067
2/12/2018	0.046
2/26/2018	0.040

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3.4. ALTERNATIVE 4 – SECONDARY MBR + RO

Alternative 4 utilizes secondary MBR followed by an RO process. The secondary MBR would be fed primary effluent from Tapia WRF and consist of four-stages (pre-anoxic, aerobic, post-anoxic and membrane basins) to provide nitrification and denitrification. This alternative would add 1.6 MGD of treatment capacity at Tapia WRF. Although, the secondary MBR uses existing carbon in the wastewater, methanol addition to the post-anoxic zone would be required at approximately 75 gpd to achieve effluent nitrate of <4.5 mg/L-N. The MBR effluent will be fed to the RO system which will achieve almost complete phosphorus removal (<0.1 mg/L-P) and lower the effluent TN concentration to <1 mg/L. The RO system will be designed similarly to the RO system for Alternative 1. **Figure 5** depicts the process schematic of the treatment train for Alternative 4 and the key design parameters for the unit processes are shown in **Appendix A**. It is estimated that a footprint of 16,000-17,000 ft^2 will be required for Alternative 4.

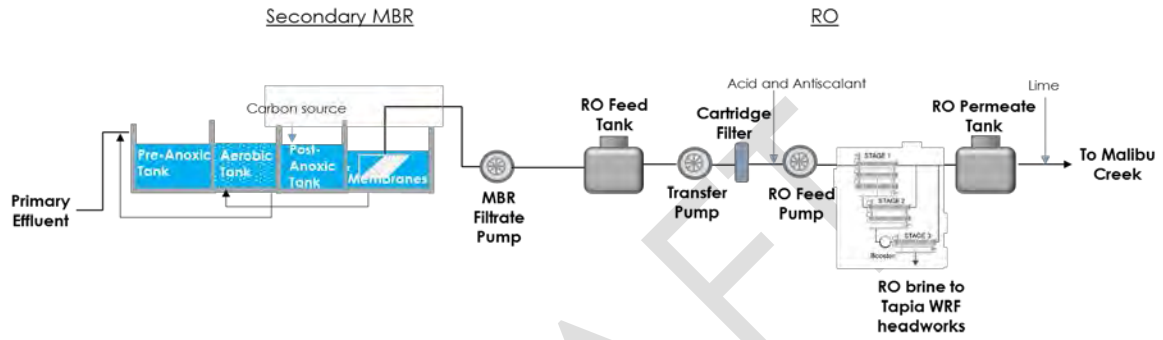

Figure 5 – Process Schematic for Alternative 4

3.5. ALTERNATIVE 5 – TERTIARY BAF + MF + RO

The last alternative consists of tertiary biologically active filtration (BAF) followed by MF/UF and RO. BAF uses reactors filled with tightly packed plastic attached-growth media which serve two functions: (1) provide a surface for microbial growth, and (2) filtration. The process will achieve denitrification to the same level as tertiary MBR and will require methanol addition at a rate of 75 gpd to achieve effluent TN of <4.5 mg/L. This is a relatively simple process compared to MBR but the effluent turbidity is not as low and consistent as with MBR. As a result, the MF/UF is required to reduce the turbidity in the BAF effluent and thereby protect the downstream RO process. The BAF process will be designed for denitrification and the RO will achieve almost complete phosphorus removal (<0.1 mg/L-P) and lower the effluent TN concentration to <1 mg/L. **Figure 6** shows the process schematic of the treatment train and the key process design parameters are shown in **Appendix A**.

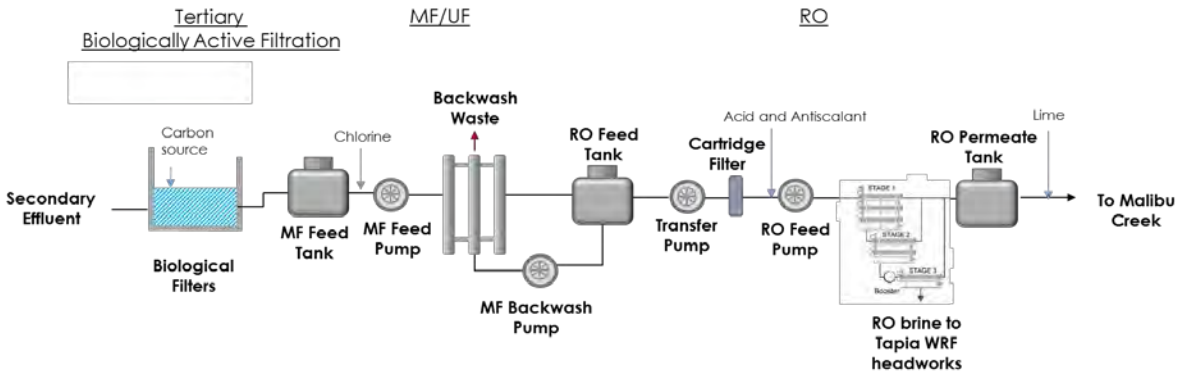

Figure 6 – Process Schematic for Alternative 5

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4. EVALUATION OF ALTERNATIVES

The main objective of this study was to identify the preferred alternative to meet TN and TP limits for the Malibu Creek augmentation flow. The selection of a preferred alternative involves evaluating each of the five process train alternatives against a pre-defined set of evaluation criteria. The alternatives were assessed and scored against each criterion, allowing for a relative comparison of alternatives.

This section presents a description for each criterion highlighting the particular considerations in applying the criteria and scores. Each alternative was scored based on qualitative and quantitative analysis within the evaluation criteria using the point system of 1 to 5, with 1 being the least favorable and 5 being the most favorable. A final summary of the scores in presented in Section 5.

4.1. CRITERION 1 – EASE OF SEASONAL OPERATION

While all of the alternatives are able to operate seasonally, some processes within a process train require additional start-up time. For example, biological processes require additional startup time for acclimation before compliant, treated water can be discharged to Malibu Creek. During this start-up period, effluent would have to be sent back to the head of Tapia WRP until the desired effluent quality is achieved. The other processes (MF, RO, IX, breakpoint chlorination) do not require this acclimation period. However, the MF/UF and RO processes require that cleaning and preservation procedures are followed to maintain the process equipment performance, which adds some operational effort and complexity when operating seasonally.

Table 5 presents the scores given to each option based on ease of seasonal operation. The higher the number, the greater flexibility and ease of starting up the treatment processes.

Table 5 – Scores for Criterion 1: Ease of Seasonal Operation

Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
1	4	5	1	1

4.2. CRITERION 2 – PERFORMANCE RELIABILITY FOR PERMIT COMPLIANCE

All alternatives are designed to produce compliant effluent to Malibu Creek. However, the biological processes perform best with a consistent influent wastewater flow and characteristics. High variability in influent characteristics and/or presence of toxicity in influent wastewater may affect treatment performance. In contrast, physiochemical processes such as MF and RO can provide fairly consistent level of treatment. However, poor quality feed may result in membranes becoming fouled or damaged affecting treatment effectiveness. Since breakpoint chlorination is the simplest process, it is expected to have the best performance reliability.

Table 6 presents the scores given to each option based on performance reliability. The higher the number, the greater reliability for permit compliance.

Table 6 – Scores for Criterion 2: Performance Reliability for Permit Compliance

Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
2	3	4	2	2

4.3. CRITERION 3 – OPERATIONAL COMPLEXITY/FAMILIARITY

The alternatives have varying degrees of operational complexity. The combination of biological and membrane processes in MBR adds operational and maintenance complexity over a traditional

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wastewater treatment process. Physicochemical processes such as MF/UF, RO and IX are not as complicated to operate but would still require additional operator training. Both the biological and physicochemical processes require additional chemicals for cleaning and the biological processes may require carbon addition to meet the effluent requirements. Breakpoint chlorination would be the simplest process to operate, since it operates on a dosage setpoint and requires minimal operator attention compared to the other alternatives. Also, the operations staff at Tapia WRF is familiar with the chlorination/dechlorination process. At present, the operations staff at Tapia WRF is not familiar with the MF and RO processes. It is anticipated they will become so in the future when the Pure Water pilot begins operations. IX is not a process currently used at LVMWD.

Table 7 presents the scores given to each option with higher numbers indicating less operational complexity and/or more operational familiarity.

Table 7 – Scores for Criterion 3: Operational Complexity/Familiarity

Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
3	4	5	2	3

4.4. CRITERION 4 – CONSTRUCTION COST

Construction costs were developed based on previous projects for similar facilities in Southern California and the estimated footprints for each process. The construction costs for each alternative are shown in **Table 8**.

Table 8 – Construction Costs of Alternatives

	Tertiary MBR + RO	MF + RO + IX	Breakpoint Chlorination	Sec MBR + RO	BAF + MF + RO
Sitework ($40/sf)	$300,000	$300,000	$50,000	$600,000	$300,000
Canopy ($60/sf)	$190,000	$180,000	$25,000	$360,000	$190,000
Concrete ($45/sf)	$330,000	$300,000	$28,000	$730,000	$340,000
Conveyance Pipeline ($20/diam.-in)	$600,000	$600,000	$300,000	$480,000	$600,000
Process Equipment	$3,000,000	$2,400,000	$130,000	$3,500,000	$3,900,000
Base Subtotal	**$4,400,000**	**$3,800,000**	**$510,000**	**$5,700,000**	**$5,300,000**
Electrical and I&C (20% of Base Subtotal)	$880,000	$760,000	$100,000	$1,140,000	$1,060,000
Mechanical Installation (10% of Base Subtotal)	$440,000	$380,000	$50,000	$570,000	$530,000
Overhead/Profit (15% of Base Subtotal)	$660,000	$570,000	$80,000	$860,000	$800,000
Contingency (20% of Base Subtotal)	$880,000	$760,000	$100,000	$1,140,000	$1,060,000
Construction Cost Subtotal	**$7,300,000**	**$6,300,000**	**$800,000**	**$9,400,000**	**$8,800,000**
Design, Engineering and Administration Fees (20% of Construction Cost Subtotal)	$1,500,000	$1,300,000	$200,000	$1,900,000	$1,800,000
CONSTRUCTION COST	**$8,800,000**	**$7,600,000**	**$1,000,000**	**$11,300,000**	**$10,600,000**

A summary of the associated scores for each alternative are provided in **Table 9**. The higher the number, the **lower** the construction cost.

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Table 9 – Scores for Criterion 4: Construction Cost

Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
2	2	5	1	1

4.5. CRITERION 5 – OPERATION AND MAINTENANCE COST

This criterion evaluated the alternatives based on their operation and maintenance (O&M) costs are shown in **Table 10**.

Table 10 – O&M Costs of Alternatives

	Tertiary MBR + RO	MF + RO + IX	Breakpoint Chlorination	Sec MBR + RO	BAF + MF + RO
Power	$74,000	$62,000	$600	$101,000	$77,000
Chemicals	$46,000	$46,000	$3,600	$46,000	$58,000
Consumables	$21,000	$22,000	$0	$23,000	$19,000
Maintenance	$24,000	$20,000	$3,000	$31,000	$29,000
Secondary Treatment Savings				-$36,000	
Total O&M Costs	**$170,000**	**$150,000**	**$7,200**	**$170,000**	**$180,000**

O&M costs are based on an assumed annual treated augmentation volume of 160 MG. A summary of the alternative scores based on O&M costs are provided in **Table 11**. The higher the number, the **lower** the O&M cost.

Table 11 – Scores for Criterion 5: Operation and Maintenance Cost

Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
2	2	5	2	1

4.6. CRITERION 6 – ENVIRONMENTAL AND COMMUNITY IMPACTS

This criterion evaluated the alternatives based on their carbon emissions and impact on TDS concentration in the Tapia final effluent and recycled water system. Carbon emissions were calculated for each alternative as follows:

- Power consumption (MWh) for process equipment was determined for each train.
- A line loss factor of 1.057 was applied to the equipment power consumption.
- The line loss corrected power consumption was used to calculate equipment carbon dioxide emissions based on an equivalency factor of 0.23 MT CO2e/MWh obtained from SoCal Edison from their annual report for Year 2015.
- Process related carbon emissions from biological processes were obtained from the BioWin model.
- The sum of equipment emissions and process emissions was used to calculate the total emissions.
- A vehicle equivalent of 4.67 MT CO2e emission per vehicle per year was used to obtain a relative number of vehicle emission equivalent per year for each process train.

The RO process concentrates TDS in the brine sidestream. The sidestream is sent back to the Tapia WRF influent for retreatment. Since the conventional treatment processes at Tapia WRF do not remove TDS, the effluent concentration discharged from the WRF is expected to increase due to this brine

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recycling. The breakpoint chlorination alternative will also result in a slight increase in recycled water TDS, as lower TDS water would go to the Creek instead of slightly diluting the recycled water when used as a supplement.

The results of this evaluation are shown in **Table 12**, which also includes each alternatives score. The higher the number, the **lower** the impacts to the environment and surrounding community.

Table 12 – Scores for Criterion 6: Environmental and Community Impacts

	Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
Vehicle Emission Equivalent	27	22	0.2	27	28
Tapia WRF Effluent TDS Concentration Increase from Existing	up to 33%[1]	up to 33%[1]	up to 11%[2]	up to 33%[1]	up to 33%[1]
Score	1	2	4	1	1

1. TDS increase from RO brine is based on 2.5 cfs (1.6 MGD) product flow from RO, and for Tapia WRF: 6.5 MGD average plant flow, 825 mg/L avg TDS

2. TDS increase from lack of potable water dilution is based on: 2.5 cfs (1.6 MGD) potable water dilution, average potable TDS of 375 mg/L, and for Tapia WRF: 6.5 MGD plant flow, 825 mg/L avg TDS

5. RECOMMENDATIONS

Five potential alternatives were identified and designed to meet the TN and TP limits for discharge into Malibu Creek. These alternatives were evaluated and scored against a set of criteria, which has been summarized in **Table 13.**

Table 13 – Summary of Scores for Alternatives

	Tertiary MBR + RO	MF/UF + RO + IX	Breakpoint Chlorination of Potable Water	Secondary MBR + RO	Tertiary BAF + MF + RO
1. Ease of Seasonal Operation	1	4	5	1	1
2. Performance Reliability for Permit Compliance	2	3	4	2	2
3. Operational Complexity/Familiarity	3	4	5	2	3
4. Construction Cost	2	2	5	1	1
5. O&M Cost	2	2	5	2	1
6. Environmental and Community Impacts	1	2	4	1	1
TOTAL SCORE	**11**	**17**	**28**	**9**	**9**

Based on this evaluation, it is recommended that the “Breakpoint Chlorination of Potable Water” be implemented as it provides the greatest operational and water quality reliability, ease of operation, and is most cost-effective.

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APPENDIX A – ALTERNATIVE INFORMATION PLATES

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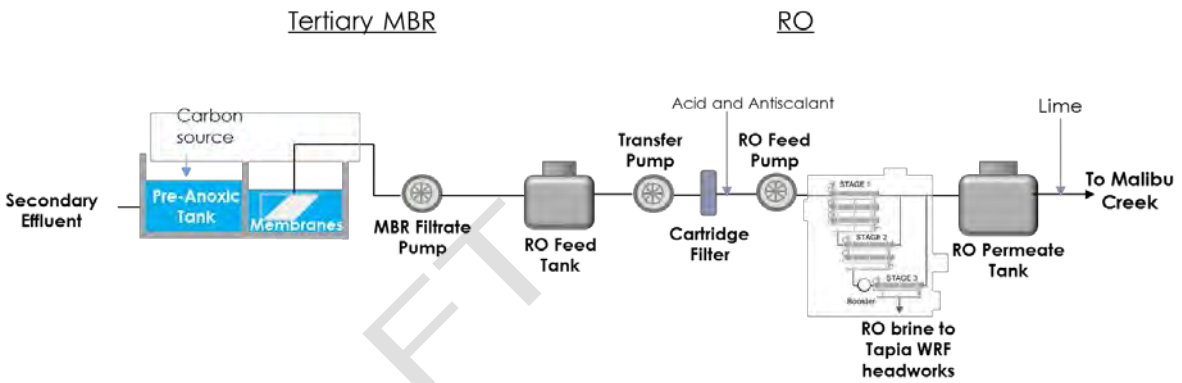
Alternative 1 – Tertiary Membrane Bioreactor + Reverse Osmosis

DESIGN CRITERIA		
MEMBRANE BIOREACTOR		
Bioreactor		
Feed Flow-rate	1,348	gpm
Feed Nitrate Concentration	10	mg/L-N
Methanol Feed Rate	75	gpd
Design SRT	10	days
HRT		
Pre-anoxic	1.2	hours
Aerobic/Membrane	0.8	hours
Total Volume	2.0	hours
Total Volume	100,000	gallons
Membrane Tank MLSS	3,600	mg/L
Membrane Filtration		
Membrane Gross Flux	14	gfd
Membrane Filtrate Recovery	90	%
Membrane Cassettes Required	8	
Number of Trains	2	
REVERSE OSMOSIS		
Feed Flow-rate	1,321	gpm
Stage 1		
Flux	11.2	gfd
Number of Elements	193	
Stage 2		
Flux	10.5	gfd
Number of Elements	97	
Stage 3		
Flux	8.5	gfd
Number of Elements	58	
Overall Recovery	85	%
Number of Trains	3	



Project Information	
Construction Cost	**$8,800,000**
O&M Cost	**$170,000**
Carbon Emissions (Vehicle Equivalent per year)	**27**
Impact on TDS (% Increase from Existing Effluent)	**33%**
Required Footprint (ft^2)	**7,000 – 8,000**

Evaluation Criteria	Score
1. Ease Of Seasonal Operation	1
2. Performance Reliability For Permit Compliance	2
3. Operational Complexity/Familiarity	3
4. Construction Cost	2
5. Operation Cost	2
6. Environmental And Community Impacts	1
TOTAL	**11**

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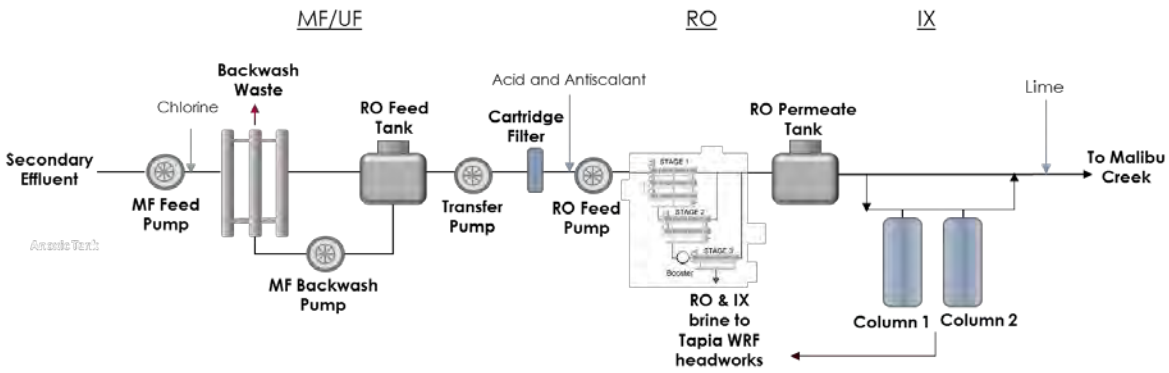
Alternative 2 – Micro/Ultrafiltration + Reverse Osmosis + Ion Exchange

DESIGN CRITERIA		
Microfiltration		
Feed Flow-rate	1,390	gpm
Membrane Gross Flux	42	gfd
Membrane Filtrate Recovery	95	%
Membrane Area per Module	775	ft^2
Membrane Modules Required	62	
Number of Trains	3	
Reverse Osmosis		
Feed Flow-rate	1,321	gpm
Stage 1		
Flux	11.2	gfd
Number of Elements	193	
Stage 2		
Flux	10.5	gfd
Number of Elements	97	
Stage 3		
Flux	8.5	gfd
Number of Elements	58	
Overall Recovery	85%	%
Number of Trains	3	
Ion-exchange		
Feed Flow-rate	864	gpm
Feed Nitate Concentration	1.6	mg/L-N
Number of Trains	3	
Lead Vessel	1	
Lag Vessel	1	
Vessel Diameter	10	ft
Resin Depth	4	ft
Resin Volume Per Vessel	314	ft^3
Total EBCT	16	min
Loading Rate	4	gpm/ft^2
Volumteric Flow	0.9	gpm/ft^3



Project Information	
Construction Cost	**$7,600,000**
O&M Cost	**$150,000**
Carbon Emissions (Vehicle Equivalent per year)	**22**
Impact on TDS (% Increase from Existing Effluent)	**33%**
Required Footprint (ft^2)	**6,000 – 7,000**

Evaluation Criteria	Score
1. Ease Of Seasonal Operation	4
2. Performance Reliability For Permit Compliance	3
3. Operational Complexity/Familiarity	4
4. Construction Cost	2
5. Operation Cost	2
6. Environmental And Community Impacts	2
TOTAL	17

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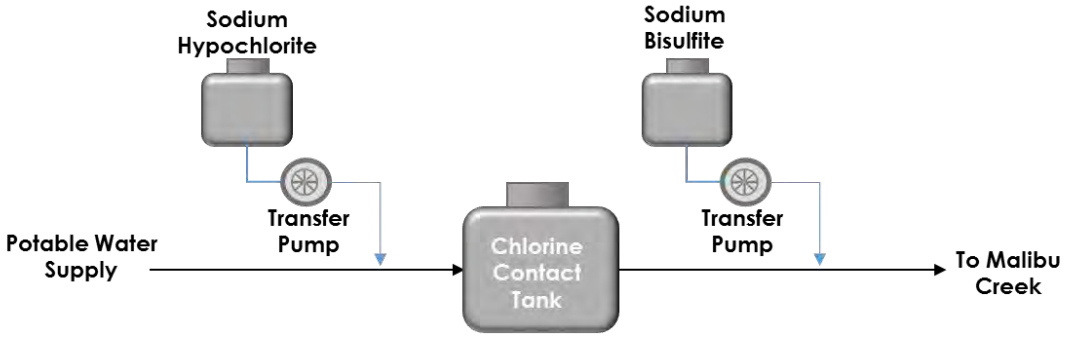
Alternative 3 – Breakpoint Chlorination of Potable Water

DESIGN CRITERIA		
Breakpoint Chlorination		
Feed Flow-rate	1,123	gpm
Feed Ammonia Concentration	0.4	mg/L-N
Chlorine dose, range	1 to 4	mg/L as Cl_2
HRT Required	20	min
Contact Tank Efficiency	0.6	
Contact Tank Volume Required	37,400	gal



Project Information	
Construction Cost	**$1,000,000**
O&M Cost	**$7,200**
Carbon Emissions (Vehicle Equivalent per year)	**0.2**
Impact on TDS (% Increase from Existing Effluent)	**11%**
Required Footprint (ft^2)	**600 - 700**

Evaluation Criteria		Score
1. Ease Of Seasonal Operation		5
2. Performance Reliability For Permit Compliance		4
3. Operational Complexity/Familiarity		5
4. Construction Cost		5
5. Operation Cost		5
6. Environmental And Community Impacts		4
	TOTAL	28

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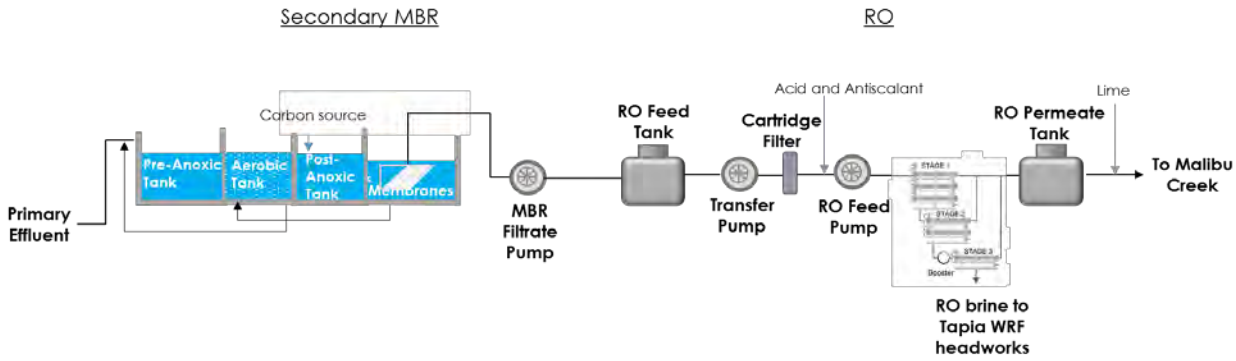
Alternative 4 – Secondary Membrane Bioreactor + Reverse Osmosis

DESIGN CRITERIA		
Bioreactor		
Feed Flow-rate	1,348	gpm
Feed Ammonia Concentration	34	mg/L-N
Methanol Feed Rate	75	gpd
Design SRT	12	days
HRT		
Pre-anoxic	2.1	hours
Aerobic	3.4	hours
Post-anoxic	1.0	hours
Membrane	0.4	hours
Total Volume	7	hours
Total Volume	441,000	gallons
Membrane Tank MLSS	6,600	mg/L
Membrane Filtration		
Membrane Gross Flux	14	gfd
Membrane Filtrate Recovery	90	%
Membrane Cassettes Required	8	
Number of MBR Trains	2	
Reverse Osmosis		
Feed Flow-rate	1,321	gpm
Stage 1		
Flux	11.2	gfd
Number of Elements	193	
Stage 2		
Flux	10.5	gfd
Number of Elements	97	
Stage 3		
Flux	8.5	gfd
Number of Elements	58	
Overall Recovery	85%	
Number of Trains	3	



Project Information	
Construction Cost	**$11,300,000**
O&M Cost	**$170,000**
Carbon Emissions (Vehicle Equivalent per year)	**27**
Impact on TDS (% Increase from Existing Effluent)	**33%**
Required Footprint (ft^2)	**16,000 – 17,000**

Evaluation Criteria	Score
1. Ease Of Seasonal Operation	1
2. Performance Reliability For Permit Compliance	2
3. Operational Complexity/Familiarity	2
4. Construction Cost	1
5. Operation Cost	2
6. Environmental And Community Impacts	1
TOTAL	**9**

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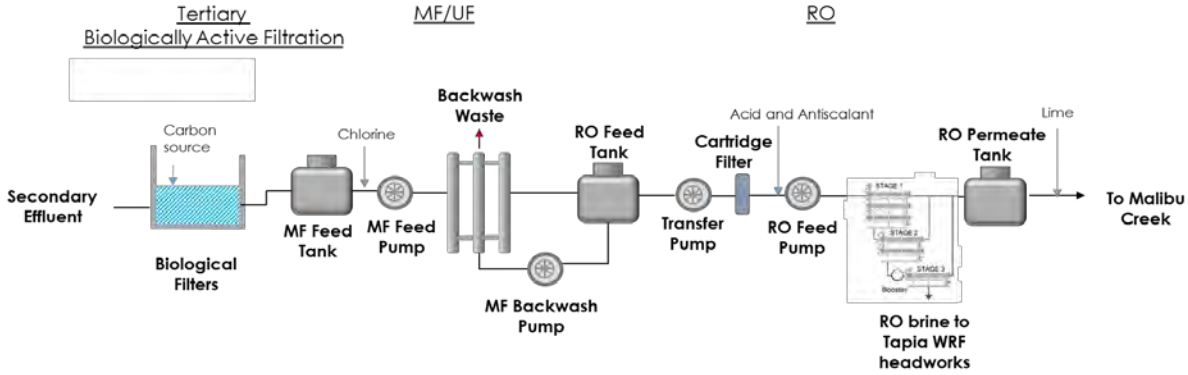
Alternative 5 – Tertiary Biologically Active Filtration + Micro/Ultrafiltration +Reverse Osmosis

DESIGN CRITERIA		
Biologically Active Filtration		
Bioreactor		
Feed Flow-rate	1,467	gpm
Feed Nitrate Concentration	10	mg/L-N
Methanol Feed Rate	75	gpd
Filtration Rate	1.5	gpm/ft²
Loading Rate	1.41	kg NO_3-N/m³/d
Recovery	95	%
Number of BAF Trains	2	
Microfiltration		
Feed Flow-rate	1,390	gpm
Membrane Gross Flux	42	gfd
Membrane Filtrate Recovery	1	%
Membrane Area per Module	775	ft²
Membrane Modules Required	62	
Number of Trains	3	
Reverse Osmosis		
Feed Flow-rate	1,321	gpm
Stage 1		
Flux	11.2	gfd
Number of Elements	193	
Stage 2		
Flux	10.5	gfd
Number of Elements	97	
Stage 3		
Flux	8.5	gfd
Number of Elements	58	
Overall Recovery	85	%
Number of Trains	3	



Project Information	
Construction Cost	**$10,600,000**
O&M Cost	**$180,000**
Carbon Emissions (Vehicle Equivalent per year)	**28**
Impact on TDS (% Increase from Existing Effluent)	**33%**
Required Footprint (ft²)	**7,000 – 8,000**

Evaluation Criteria	Score
1. Ease Of Seasonal Operation	1
2. Performance Reliability For Permit Compliance	2
3. Operational Complexity/Familiarity	3
4. Construction Cost	1
5. Operation Cost	1
6. Environmental And Community Impacts	1
TOTAL	**9**

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May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Tapia Water Reclamation Facility Fiscal Year 2017-18 Rehabilitation Project: CEQA Determination and Call for Bids

SUMMARY:

On December 4, 2017, the JPA Board authorized the Administering Agent/General Manager to execute a professional services agreement, in the amount of $55,404, for engineering design and design support during construction for the Tapia Water Reclamation Facility Fiscal Year 2017-2018 Rehabilitation Project. The scope of work consists of a compilation of the work originally planned through three budgeted capital improvement projects, including replacing deteriorated grit and skimmings piping, replacing slide gates for Channel No. 4 of the secondary sedimentation basins and rehabilitating Primary Clarifier Nos. 4 and 5. During design of the project, an additional concrete repair area was identified in Secondary Clarifier No. 5. The Administering Agent/General Manager authorized a design scope change, in the amount of $4,800, to include the concrete additional repair area in the design plans and specifications for the project.

The work is categorically exempt from the California Environmental Quality Act (CEQA), pursuant to Section 15301(b) of the CEQA Guidelines because it involves only minor alterations to an existing facility with no expansion of use. The design is now complete, and staff recommends issuance of a Call for Bids for the project.

RECOMMENDATION(S):

Find that the work is exempt from the California Environmental Quality Act and approve the issuance of a Call for Bids for the Tapia Water Reclamation Facility Fiscal Year 2017-18 Rehabilitation Project.

FISCAL IMPACT:

No

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

There is no financial impact associated with a Call for Bids.

DISCUSSION:

The Tapia Water Reclamation Facility Fiscal Year 2017-18 Rehabilitation Project involves replacement or rehabilitation of equipment in three different areas of Tapia: (1) rehabilitation of Primary Clarifier Nos. 4 and 5, (2) replacement of grit and skimmings piping, and (3) replacement of slide gates for Channel No. 4 of the secondary sedimentation basins. These three work items were originally planned and budgeted as three separate capital improvement projects; however, staff recommended the work be combined into one project to provide a cost-savings for design, bidding and construction. In addition, the work will require carefully phased construction for the three work areas to avoid impacting on-going treatment operations. By having one contractor complete all of the work, staff can better control and specify the phasing of work.

The first work item incorporated into the project is the rehabilitation of Primary Clarifier Nos. 4 and 5. Primary sedimentation at Tapia is accomplished using five concrete, rectangular sedimentation tanks that are approximately 125 feet long, 20 feet wide, and 12 feet deep. Over time, the concrete in and around the vapor space of the primary clarifiers (the upper +/- 3 feet) has deteriorated due to exposure to gas from the influent wastewater. Concrete spalling has been observed in several places on the clarifier deck, and inspection of the interior of the tanks revealed locations of weakened concrete. To date, the rehabilitation work has occurred in phases to accommodate normal wastewater treatment operations. The first phase involved the rehabilitation of Primary Clarifier No. 1 in November 2014. The second phase was the rehabilitation of Primary Clarifier Nos. 2 and 3 in February 2017. The proposed project would complete the third and final phase, which would rehabilitate Primary Clarifier Nos. 4 and 5.

The second work item incorporated into the project is the rehabilitation of the grit and skimmings piping. Grit and skimmings piping, both from the headworks' grit channels and the primary sedimentation basins was installed approximately 30 years ago, has exceeded its useful service life and requires replacement. The existing piping is above-ground, secured on adjacent concrete walls and structures, ranges in size from 4 to 8 inches and is constructed primarily of glass-fused steel. Repeated repairs have been required due to the age and condition of the pipe.

The third work item incorporated into the project is the rehabilitation of the secondary effluent slide gates for Channel No. 4 of the secondary sedimentation basins. The gates return the activated sludge from the secondary sedimentation basins to the reaeration basins and then to the return activated sludge pumps. Hydraulic head pushes the sludge into Channel No. 4 through two pipes in each secondary effluent gate (one mounted inside and one outside). The gates are constructed of aluminum and bolted to aluminum boxes, which are supported by a bracket system attached to the walls of the channel. The gates control the flow of the sludge from the secondary sedimentation basins into Channel No. 4. Due to the corrosive environment, the aluminum gates and boxes have deteriorated and require replacement with longer-lasting stainless steel gates.

Design is now complete and staff recommends issuance of a Call for Bids for the project. Following is a summary of the proposed bid schedule:

Call for Bids	May 7, 2018
1st Advertisement	May 10, 2018
2nd Advertisement	May 17, 2018
Pre-Bid Meeting	May 30, 2018
Bids Open	June 7, 2018
Award of Contract	July 2, 2018
Project Completion	January 2019 (est.)

Attached is a Notice of Exemption that staff proposes to file, pending Board approval of the CEQA determination. Also attached is a copy of the Notice Inviting Sealed Proposals.

Prepared by: Coleman Olinger, P.E., Associate Engineer

ATTACHMENTS:

Notice of Exemption
Notice Inviting Sealed Proposals

Notice of Exemption

Form D

To: Office of Planning and Research
P.O. Box 3044, Room 212
Sacramento, CA 95812-3044

County Clerk
County of Los Angeles
12400 Imperial Highway
Norwalk, CA 90650

From: (Public Agency) Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302
(Address)

Project Title: Tapia Water Reclamation Facility Fiscal Year 2017-2018 Rehabilitation Project

Project Location - Specific:

Tapia Water Treatment Facility, 731 Malibu Canyon Road, Calabasas, CA

Project Location – City: Calabasas Project Location – County: Los Angeles

Description of Nature, Purpose and Beneficiaries of Project:

Rehabilitation and coating of primary clarifiers no. 4 & 5, replacement of grit and skimmings piping, and replacement of slide gates on secondary sedimentation basins.

Name of Public Agency Approving Project: Las Virgenes Municipal Water District

Name of Person or Agency Carrying Out Project: Las Virgenes Municipal Water District

Exempt Status: **(check one)**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: Existing Facilities: Section 15301.b
- ☐ Statutory Exemptions. State code number:

Reasons why project is exempt:

Minor alternation to existing facilties with no expansion beyond current use.

Lead Agency Contact Person: Coleman Olinger, P.E. Area Code/Telephone/Extension: 818-251-2163

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: Date: 5/7/2018 Title: Associate Engineer

☒ Signed by Lead Agency
☐ Signed by Applicant

Date received for filing at OPR:

Revised 2005

NOTICE INVITING SEALED PROPOSALS (BIDS)
LVMWD Tapia Water Reclamation Facility Rehabilitation FY 17-18

NOTICE IS HEREBY GIVEN that the Board of Directors of Las Virgenes-Triunfo Joint Powers Authority (JPA) invites and will receive sealed proposals (bids) up to the hour of 3:00PM on June 7, 2018, for furnishing the work described in the contract documents. Bids received after the time stated in the Call for Bids will not be accepted and will be returned, unopened, to the bidder. The time shall be determined by the time on the receptionist telephone console in our Headquarters lobby. Proposals will be publicly opened and read aloud at the office of the JPA, 4232 Las Virgenes Road, Calabasas, California 91302. Said bids shall conform to and be responsive to the Specifications and Contract Documents for said work as heretofore approved by the JPA.

*A **mandatory** pre-bid tour will be conducted at 9:00AM on May 30, 2018. The meeting will begin at the JPA headquarters at 4232 Las Virgenes Road, Calabasas, CA 91302. Attendance at the pre-bid conference is a condition precedent to submittal of the bid and the JPA will not consider a bid from any bidder not represented at the pre-bid conference. Questions regarding the project may be directed to Project Manager, Coleman Olinger, P.E., at (818) 251-2163.*

Sets of contract documents may be downloaded for free by going to http://www.LVMWD.com/Ebidboard and following the links to this project.

In order to be placed on the plan holder's list, contractors shall register for free as a document holder for this project on Ebidboard by going to www.LVMWD.com/Ebidboard and following the links to this project. Addendum notifications will be issued through Ebidboard.com, but may also be provided by calling the District's Project Manager. Although Ebidboard will fax and/or email all notifications to registered plan holders after the JPA uploads the information, Bidders are responsible for obtaining all addenda and updated contract documents.

Each bid must be on the JPA bid form and shall be sealed and filed with the secretary of the JPA at or before the time stated in the Notice.

No Contractor or Subcontractor may be listed on a bid proposal for a public works project submitted on or after March 1, 2015 unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. No Contractor or Subcontractor may be awarded a contract for public work on a public works project awarded on or after April 1, 2015 unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. Effective January 1, 2016, no Contractor or Subcontractor may perform on a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. This project is subject to compliance monitoring and enforcement by the DIR.

All terms and conditions contained in the Specifications and Contract Documents shall become part of the contract. The Board of Directors of the JPA reserves the right to

reject any and all bids and to waive any and all irregularities in any bid. No bidder may withdraw his bid after the said time for bid openings until 60-days thereafter or until the JPA has made a final award to the successful bidder or has rejected all bids, whichever event first occurs.

The Board of Directors of the JPA reserves the right to select the schedule(s) under which the bids are to be compared and contract(s) awarded.

BY ORDER OF THE GOVERNING BODY OF
LAS VIRGENES - TRIUNFO JOINT POWERS AUTHORITY

_____ _____

Dated *Glen Peterson,*
Chair

May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Rancho Amendment Bin and Conveyance Modifications Project: Call for Bids

SUMMARY:

On May 1, 2017, the JPA Board authorized the Administering Agent/General Manager to execute a professional services agreement with Stantec Consulting Services, Inc., in the amount of $124,915, for engineering design, bidding services and services during construction for the Rancho Amendment Bin and Conveyance Modifications Project. The design is now complete, and staff recommends issuance of a Call for Bids for the project.

Additionally, staff recommends that the Board make a finding that the proposed amendment bin and conveyance equipment be designated by specific trade name to match the existing equipment at the facility, pursuant to Section 3400 of the Public Contract Code. By matching the existing equipment, the new equipment will seamlessly integrate, preventing conflicts due to the complexity of the existing system and process. Also, the use of matching the equipment will reduce future maintenance costs by allowing for consolidated contracts and utilizing common parts and spares.

RECOMMENDATION(S):

Find that the proposed amendment bin and conveyance equipment should be designated by specific trade name to match the existing equipment and authorize a Call for Bids for the Rancho Amendment Bin and Conveyance Modifications Project.

FISCAL IMPACT:

No

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

There is no financial impact associated with a Call for Bids.

DISCUSSION:

The amendment storage bin at the Rancho Las Virgenes Composting Facility is oversized, highly complex, deteriorating and has reached the end of its useful life. The bin was designed to receive and store up to 370 cubic yards of amendment, anticipating a 16 MGD build-out at the Tapia Water Reclamation Facility. However, due to lower flows at Tapia and a revised capacity of 12 MGD, a smaller amendment bin is needed. Due to the bin's large size, the amendment stored within it is not being turned over properly, resulting in corrosion and heavy pitting on the sides of the bin.

The perforated grate, through which blowers send air to reduce the moisture content of the amendment, has become clogged and no longer functions efficiently. The bin itself is difficult and costly to maintain and takes up a large amount of space. In addition, the amendment has a tendency to build up at the front of the bin, requiring operators to open its hatches and distribute the amendment manually using shovels. The manual handling of the amendment near mechanical equipment can pose a safety concern.

The proposed project consists of removing and replacing the existing bin with a smaller version and extending the amendment delivery conveyor to the new bin. The new bin will include live-bottom screws along with leveling screws to better control the handling of the amendment and reduce bridging of material within the bin. The bin will maintain the existing dust control and fire suppression systems, which were included in the original design of the facility for safety. The equipment and controls will be integrated into the facility's existing control system. Due to the complexity of the equipment and the need for a comprehensive, fully-functional system, use of a sole supplier to match the existing equipment is recommended.

During removal and installation of the new bin, staff proposes to temporarily shut down the composting and cure process, hauling dewatered cake for disposal. This will result in additional cost for hauling the cake but also results in a cost-savings from reduced amendment purchases. The temporary shutdown will also creates an opportunity to perform maintenance tasks in reactor and cure buildings that cannot be performed with the system in operation. Staff will include an analysis of costs and savings at the time of recommending award of a construction contract.

Design of the project is now complete, and staff recommends issuance of a Call for Bids. On May 1, 2017, the Board determined that the project was exempt from the provisions of the California Environmental Quality Act.

Following is a summary of the proposed bid schedule:

Call for Bids	May 7, 2018
1st Advertisement	May 10, 2018
2nd Advertisement	May 17, 2018
Pre-Bid Meeting	May 24, 2018
Bids Open	June 18, 2018
Award of Contract	July 2, 2018
Completion	February 2019 (est.)

Prepared by: Eric Schlageter, P.E., Senior Engineer

ATTACHMENTS:

Notice Inviting Sealed Proposals

NOTICE INVITING SEALED PROPOSALS (BIDS)
Amendment Bin and Conveyance Modifications

NOTICE IS HEREBY GIVEN that the Board of Directors of Las Virgenes - Triunfo Joint Powers Authority (JPA) invites and will receive sealed proposals (bids) up to the hour of 3:00PM on June 18, 2018, for furnishing the work described in the contract documents. Bids received after the time stated in the Call for Bids will not be accepted and will be returned, unopened, to the bidder. The time shall be determined by the time on the receptionist telephone console in our Headquarters lobby. Proposals will be publicly opened and read aloud at the office of the JPA, 4232 Las Virgenes Road, Calabasas, California 91302. Said bids shall conform to and be responsive to the Specifications and Contract Documents for said work as heretofore approved by the JPA.

*A **mandatory** pre-bid tour will be conducted on May 24, 2018. The meeting will begin at the JPA headquarters at 4232 Las Virgenes Road, Calabasas, CA 91302. Attendance at the pre-bid conference is a condition precedent to submittal of the bid and the JPA will not consider a bid from any bidder not represented at the pre-bid conference. Questions regarding the project may be directed to Project Manager, Eric Schlageter at (818) 251-2142.*

Bidders are notified that the JPA Board has found the need to match the existing equipment currently used at the District's Rancho Las Virgenes facility pursuant to Public Contracts Code section 3400. Bidders, in submitting a bid, acknowledge and consent to accept the equipment supplier listed for the project as noted within the contract documents and specifications.

Sets of contract documents may be downloaded for free by going to http://www.LVMWD.com/Ebidboard and following the links to this project.

In order to be placed on the plan holder's list, contractors shall register for free as a document holder for this project on Ebidboard by going to www.LVMWD.com/Ebidboard and following the links to this project. Addendum notifications will be issued through Ebidboard.com, but may also be provided by calling the District's Project Manager. Although Ebidboard will fax and/or email all notifications to registered plan holders after the JPA uploads the information, Bidders are responsible for obtaining all addenda and updated contract documents.

Each bid must be on the JPA bid form and shall be sealed and filed with the secretary of the JPA at or before the time stated in the Notice.

No Contractor or Subcontractor may be listed on a bid proposal for a public works project submitted on or after March 1, 2015 unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. No Contractor or Subcontractor may be awarded a contract for public work on a public works project awarded on or after April 1, 2015 unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. Effective January 1, 2016, no Contractor or Subcontractor may perform on

a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. This project is subject to compliance monitoring and enforcement by the DIR.

All terms and conditions contained in the Specifications and Contract Documents shall become part of the contract. The Board of Directors of the JPA reserves the right to reject any and all bids and to waive any and all irregularities in any bid. No bidder may withdraw his bid after the said time for bid openings until 60-days thereafter or until the JPA has made a final award to the successful bidder or has rejected all bids, whichever event first occurs.

The Board of Directors of the JPA reserves the right to select the schedule(s) under which the bids are to be compared and contract(s) awarded.

BY ORDER OF THE GOVERNING BODY OF
LAS VIRGENES - TRIUNFO JOINT POWERS AUTHORITY

_____ _____

Dated *Glen Peterson, Chair*

ITEM 10A

INFORMATION ONLY

May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Tapia and Rancho Operations and Maintenance Project List: Completion

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SUMMARY:

On October 2, 2017, the JPA Board accepted a proposal from KEH & Associates, Inc., to develop a project list for both the Tapia Water Reclamation Facility and Rancho Las Virgenes Composting Facility. The purpose of the effort was to categorize and prioritize operations and maintenance projects, as well as capital improvement projects, proposed for the two major facilities. The development of the list included a workshop with operations and maintenance staff to determine potential future projects. The resulting proposed projects were ranked based upon several factors, including asset condition, safety, consequence of failure, regulatory compliance and efficiency.

Attached is a copy of the completed report and project list. Some of the projects are relatively small and can be completed by JPA staff. Other projects are larger and warrant inclusion in the JPA's Infrastructure Investment Plan.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

The total cost of the work was $69,824, which is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District.

DISCUSSION:

The JPA's plans to move forward with implementation of the Pure Water Project Las Virgenes-Triunfo provides assurance that the level of treatment required at the Tapia Water Reclamation Facility and Rancho Las Virgenes Composting Facility will remain basically unchanged. As a result, staff can focus the operation and maintenance needs of the two major

facilities to maximize and extend their useful life.

Tapia was originally completed in 1965 and has undergone four major expansions. The majority of its equipment is over 30 years old, and many assets have been in service past their expected life. The Rancho Las Virgenes Composting Facility was completed in 1994, and there are many areas of the facility that require maintenance. It is prudent to perform upgrades and repairs to extend the useful life of these critical facilities.

The JPA addresses and plans large projects through its Infrastructure Investment Plan (IIP). Examples include the Process Air Improvements Project at Tapia and the Amendment Bin and Conveyance Modifications Project at Rancho. To address more minor improvements, a $100,000 annual reliability fund in each fiscal year budget has been established to for items such as aging structures, leaking pipes, failed coatings, mechanical issues, and general SCADA and electrical needs.

One concern in addressing the smaller operation and maintenance projects was that the work may be implemented without full consideration of the potential impact on future capital projects, which could result in re-work and/or inefficiencies. To avoid this potential consequence, KEH & Associates, Inc., was retained to develop an operations and maintenance project list. The scope of work included a review of current operations and maintenance needs, together with capital improvement projects planned for Tapia and Rancho. A workshop with operations and maintenance staff was conducted to evaluate potential future projects. The projects were then ranked based upon several factors, including the following:

1. The condition and remaining asset life
2. The impact on safety and working environment
3. The consequence of failure
4. Regulatory compliance
5. Cost efficiency
6. Energy efficiency

Many of the projects from the list were integrated into existing IIP projects. Others can be implemented by JPA staff or contractors according to their relative priorities. Attached is a copy of the final report, which includes estimated costs and a recommended year for implementation of each project.

Prepared by: Brett Dingman, Water Reclamation Manager

ATTACHMENTS:

Tapia and Rancho Operations and Maintenance Project List

Las Virgenes-Triunfo Joint Powers Authority

Operations and Maintenance Projects for Tapia WRF and Rancho Composting Facility

& ASSOCIATES

March 2018

TECHNICAL MEMORANDUM

Date:	March 29, 2018
To:	Brett Dingman, PE, Las Virgenes Municipal Water District
From:	Ryan Gallagher, PE, KEH & Associates
	John Thayer, PE, KEH & Associates
	Ben Porritt, PE, SE, Gannett Fleming, Inc.
	Pat Sweeney, CSI Services, Inc.
Reviewed By:	Libby Tortorici, PE, KEH & Associates
	John Jardin, KEH & Associates
Subject:	O&M Projects for Tapia WRF and Rancho Composting Facility

SECTION 1 - INTRODUCTION

1.1 Background

The Las Virgenes-Triunfo Joint Powers Authority (JPA) owns and operates two wastewater facilities: the Tapia Water Reclamation Facility (Tapia) and the Rancho Las Virgenes Composting Facility (Rancho).

Tapia was originally constructed in 1965 with a wastewater treatment capacity of 0.5 million gallons per day (MGD). After five (5) expansions, Tapia currently has a capacity of up to 12 MGD, but currently averages 6 MGD. Tapia treats wastewater and produces recycled water that is used for irrigation of public and commercial landscaping, including golf courses, schools, medians, and parks. Tapia incorporates the following unit treatment processes to produce Title 22 recycled water:

- Vertical slatted bar screen and grit chamber
- Primary sedimentation tanks
- Activated sludge treatment
- Secondary sedimentation tanks
- Flocculation and filtration
- Disinfection

Wastewater residual solids generated during wastewater treatment at Tapia are pumped to Rancho using a 4-mile pipeline. These solids undergo anaerobic digestion, dewatering, composting and then are distributed to the public as Class A Exceptional Quality compost. The Rancho facility was constructed in 1994.

The JPA has been progressing through the projects identified in their Capital Improvements Plan (CIP), which was developed by their previous Sanitation Master Plan Update in 2014 and as updated in the five-year CIP. Additionally, the JPA is making minor Operation and Maintenance (O&M) improvements, as identified by their operators, using an approximate $100,000 annual

budget for each facility. The O&M budget is intended to address issues such as aging structures, pipes that leak, failed coatings, mechanical issues, generator problems, and general SCADA and electrical needs.

1.2 Objective

The JPA has expressed concern that current and planned O&M improvements might be implemented without consideration of the impacts on future projects, which could potentially result in re-work and/or fiscal and manpower inefficiencies. The goal of this project is to provide the JPA with a concise, organized, practical list of rehabilitation projects that are prioritized, categorized by type (safety, regulatory, etc.) and location, and includes planning level magnitude level estimates of probable costs. This O&M Project Plan incorporates input from the facility O&M personnel and is intended to be a high-level planning document, not a master plan.

SECTION 2 – CIP DEVELOPMENT

The general process to develop the O&M Project Plan is illustrated in **Figure 1** and further detailed in the following section.

FIGURE 1
CIP DEVELOPMENT PROCESS

The benefit of this approach is that JPA staff will be able to utilize the format and process that is established as part of this effort when conducting future updates using internal resources.

2.1 Evaluation Criteria

In accordance with Task 3.2 of the contract scope of work, each project was scored against evaluation criteria, as established in conjunction with JPA staff as part of Task 3.1 Operator Workshop.

Projects are proposed to be screened on safety, assessed condition, and regulatory compliance. Projects required to maintain a safe working environment, prevent eminent equipment failure in the next two years, or maintain regulatory compliance are designated “Top Priority” (TP).

All projects not screened into the “Top Priority” category move into the project prioritization process. The project prioritization process utilizes the established evaluation criteria and assigns a weighted value between 1 and 4 to each, with 1 being the lowest importance and 4 being the highest importance. **Table 1** lists the four evaluation criteria and associated category weight.

Each project is scored against the four evaluation criteria with priority value assignments ranging from 1 to 5, with 1 representing no relevance, 3 representing medium relevance, and 5 representing high relevance. If a specific evaluation category bears no relevance to the project, the project is assigned a rating of 1.

The resulting priority score for each project is the product of the category weight value and the priority value assigned. The composite score for each project is the sum of its priority scores in each of the four evaluation categories. Recommendation of project implementation is based on each project's composite score. The priority project rating can vary from year to year based on specific circumstances at the JPA facilities. As such, the JPA is recommended to update the evaluation on an annual basis.

Table 1 presents the Priority Ranking System used.

TABLE 1
EVALUATION CRITERIA

EVALUATION CRITERIA	CATEGORY WEIGHT *(5 = HIGHEST PRIORITY)*
Safety and Impacts to the Public	*Top Priority*
Regulatory Compliance	*Top Priority*
Fail within 2 years	*Top Priority*
Consequence of Failure	4
O&M Cost Efficiency	3
Condition and Remaining Asset Life (beyond 2 yrs)	2
Ease of Operations (reliability)	1

Further definition of the evaluation criteria is provided as **Table 2**.

TABLE 2
CRITERIA DEFINITIONS

CRITERIA TYPE	CATEGORY	DESCRIPTION
Top Priority	Safety	This type of project is required to mitigate or avoid harm to operators or the public.
	Regulatory Compliance and Impacts to the Public	This type of project is required to maintain regulatory compliance for plant discharge/operations and mitigate impacts or nuisances to the public.
	Fail within 2 years	This type of project is required when equipment, facilities or other infrastructure are estimated to fail within 2 years.
General	Consequence of Failure	Rating shall be based on the relative impact of the failure of the subject equipment, facility or infrastructure. For example, a valve with no redundancy that isolates a key process and would be needed in an emergency must operate; if it is not then it would be rated high for this category (5).
	O&M Cost Efficiency	Rating shall be based on whether the equipment or infrastructure provides optimal operational efficiency. For example, a pump which could be replaced with a more efficient technology (i.e. energy, operator time, maintenance, etc.) would be rated high for this category (5).
	Condition and	This category applies only to equipment, facilities or infrastructure that

Remaining Asset Life (beyond 2 years)	has a remaining asset life beyond two years. Ratings shall be applied based on the estimated useful life remaining. For example, a coating that is within 20-30% of its useful life span would be rated high for this category (5).
Ease of Operations (Reliability)	Rating shall be based on the relative ease of operations. This includes the reliability of the equipment. For example, an outdated control panel that does not work reliably or cannot be maintained without specialty outside technical support, would be rated high for this category (5).

The final O&M Project Plan is based on the evaluation criteria provided in **Table 2**, and the subsequent composite scores. In addition, projects are grouped to provide delivery efficiency. Situations that result in increased delivery efficiency include projects that can be combined to provide economy of scale as a larger project, can be completed as part of a single process shutdown, or are otherwise completed as a group with lower cost or reduced impact to operations.

2.2 Initial Workshop

KEH conducted an initial site visit and workshop on November 15th, 2017. The workshop covered confirmation of the evaluation criteria, establishment of project nomenclature and deliverable format, and review of the initial project list provided by the JPA. The site visit included a walkthrough of both Tapia and Rancho. The attendee list for the workshop is summarized in **Table 3**.

TABLE 3
WORKSHOP PARTICIPANTS

NAME	AGENCY/COMPANY	POSITION/ROLE
David Lippman	LVMWD	Operations Manager
Brett Dingman	LVMWD	Water Reclamation Manager
Wayne Wink	LVMWD	Chief Water Reclamation Operator
Shawn Triplett	LVMWD	Facilities and Maintenance Supervisor
Mike Varbel	LVMWD	Senior Operator
Robert Robins	LVMWD	Compost Operations Plant Supervisor
John Gil	LVMWD	Senior Electrical/ Instrumentation Technician
Jon Meredith	LVMWD	Maintenance Mechanic
Ryan Gallagher	KEH & Associates	Project Manager
Frank Dodge	KEH & Associates	Project Engineer
John Jardin	KEH & Associates	Operations
Libby Tortorici	KEH & Associates	Engineer/Operations
John Thayer	KEH & Associates	Engineer
Ben Porritt	Gannett Fleming	Structural
Pat Sweeney[(a)]	CSI	Coatings

Notes:
(a) Pat Sweeney completed independent site visit on December 5th, 2017.
(b) Not all LVMWD staff participated in the site walk. List indicates those in the workshop portion.

Prior to the workshop, the JPA provided an initial list consisting of 12 projects for Rancho and 48 projects for Tapia. The initial list reflected input collected from JPA operators and is provided as **Appendix A –**

O&M Staff Project List. The projects were each discussed to establish a detailed understanding and justification. Projects that were already included in other CIP projects were removed from the list.

In addition, the project areas for both facilities were established at the meeting. These distinct areas are illustrated in **Appendix B – Project Areas**. The purpose of these is to provide a legend for project nomenclature, such that project numbers will indicate the vicinity of the improvement.

2.3 Project Selection Process

Using the information gathered from the site visit and input from JPA staff, a complete project list was developed. The potential projects were rated based on the criteria established in Section 2.1 and additional details were prepared, including description, location, project type (i.e. planning, design or construction), justifications, and magnitude of cost.

The total estimated implementation cost of the 71 projects included in the complete project list is approximately $3.9M. The following process was used to prioritize the complete project list into the final O&M Project Plan:

1. **Potential CIP Removed**. Projects estimated to exceed $100,000 were removed. These projects should be considered for implementation under separate JPA funding or included for consideration in the next Master Plan update. A total of eight projects met these criteria and are estimated to cost $1.4M. A list of these projects is provided as **Appendix C – Potential CIP Projects**.
2. **CIP Related O&M Projects Removed**. Projects that can be implemented as part of a CIP project already included in the JPA's 5-Year CIP were removed. By including these projects as part of existing CIP project, the JPA can benefit from a single mobilization and economy of scale. A total of ten projects met these criteria and are estimated to cost $0.7M. A list of these projects is provided as **Appendix D – Current CIP Coordination**.
3. **Establish O&M Schedule.** With the larger CIP and CIP related projects removed, the remaining projects were prioritized into five, sequential annual budgets for each facility. The JPA budget is set at $100,000 for O&M projects at each facility (CIP 70008 and 70003), so for each budget year a total combined project cost of $100,000 was targeted. The project prioritization was based on several factors, including TP status, combined score, coordination with other projects (i.e. proper phasing), coordination with similar types of projects (i.e. concrete rehab) and coordination with projects in the same area. These projects are provided as **Appendix E: Project Implementation – Tapia** and **Appendix F: Project Implementation - Rancho.**

   O&M projects that were not included in the initial 5-year projection are included in this table but are noted for implementation beyond 2023. As the JPA implements the planned O&M projects, these future projects can be re-evaluated and added to the plan as needed.

2.4 Project Summary and Descriptions

For the projects identified for inclusion in the first five years of the O&M Project Plan, detailed descriptions were provided. These project descriptions are provided in **Appendix G: Project Details – Tapia** and **Appendix H: Project Details – Rancho.** A summary of the Tapia projects is provided in **Table 4.**

TABLE 4
5-YEAR O&M PROJECT SUMMARY - TAPIA

YEAR	PROJECT NO.	NAME	COST
2018-19	T-1-1	Influent PS Scaffolding Fall Protection	$30,000
2018-19	T-10-1	Chemical Pipe Replacement	$16,000
2018-19	T-1-2	Whiteroom Rehabilitation	$55,000
2018-19	T-1-3	Barricade Elevated Belt Press Building Doorways	$5,000
		Total Year 1	**$106,000**
2019-20	T-14-1	Meter Replacement	$60,000
2019-20	T-14-2	Fall Protection	$41,000
		Total Year 2	**$101,000**
2020-21	T-1-6	Building Exterior Rehabilitation	$10,000
2020-21	T-All-1	Concrete Support Replacement	$20,000
2020-21	T-11-1	Aluminum Sulfate Pump Replacement	$40,000
2020-21	T-6-3	Filter Gallery Panel Replacement	$32,000
		Total Year 3	**$102,000**
2021-22	T-1-7	Access Hatch Rehabilitation	$20,000
2021-22	T-2-1	NS/EW Galley Rehabilitation	$30,000
2021-22	T-6-2	36-inch Primary Influent Collar Replacement	$10,000
2021-22	T-All-5	Basin Leak Repair	$20,000
2021-22	T-10-2	Sodium Hypochlorite Tanks Condition Assessment	$10,000
2021-22	T-10-3	Sodium Bisulfite Chemical Area Rehabilitation	$13,000
		Total Year 4	**$103,000**
2022-23	T-8-2	Baffle/Diffuser Piping Coating	$60,000
2022-23	T-14-4	Valve Coating	$10,000
2022-23	T-6-1	VFD Cooling	$10,000
2022-23	T-9-2	Control Building Condition	$20,000
		Total Year 5	**$100,000**
		Total – All 5 Years	**$512,000**

Table 4 summarizes 20 projects for approximately $0.5M. An additional 19 projects for a total of $0.9M were not included in this list, as they exceed the current budgeted amount for annual O&M projects.

A summary of the Rancho projects is provided in **Table 5**.

TABLE 5
5-YEAR O&M PROJECT SUMMARY – RANCHO

YEAR	PROJECT NO.	NAME	COST
2018-19	R-4-1	Reactor Building Rehab and Safety System	$10,000
2018-19	R-4-2	Conveyor Structural Supports	$40,000
2018-19	R-9-3	Digester HEX Piping	$40,000
2018-19	R-All-1	Permanent Generator	$24,000
		Total Year 1	**$114,000**
2019-20	R-10-1	Odor Control Alternatives Study	$30,000
2019-20	R-5-1	Dust Control	$20,000
2019-20	R-6-1	Citric Acid	$60,000
		Total Year 2	**$110,000**
2020-21	R-6-3	Recirculation Pump	$25,000
2020-21	R-6-4	Polymer Evaluation	$15,000
2020-21	R-6-5	Crane Modification	$20,000
2020-21	R-9-1	Beam Retrofit	$30,000
		Total Year 3	**$90,000**
2021-22	R-8-2	Access Stairs	$40,000
2021-22	R-9-2	Install Monorail Crane	$60,000
		Total Year 4	**$100,000**
2022-23	R-1-1	Communications Platform	$75,000
		Total Year 5	**$75,000**
		Total – All 5 Years	**$489,000**

2.5 Next Steps

The 5-Year O&M Project Plan provides the information needed to budget and execute the required O&M improvements at each facility. However, priorities can change over time and new projects can arise. As such, KEH recommends that the JPA review this project list and schedule on an annual basis. With the baseline projects and evaluation criteria established for the JPA, the same process outlined in this Technical Memorandum can be completed with minimal effort.

In addition, due to the high number of projects identified for Tapia, the JPA should consider adjusting the annual O&M budget to accommodate completion of these projects on a faster schedule.

APPENDIX A
O&M STAFF PROJECT LIST

LVMWD Staff Project List

Rancho:

1. Polymer tanks and associated piping heating. This would include putting blanketing material on the outside of the polymer tanks, and putting insulation material on the associated piping from the tank to the dynablend mixer.
2. Teleconferencing ability. This would allow Rancho and Tapia to video-chat during morning meetings.
3. Smart Helmet implementation. See attached video. https://www.youtube.com/watch?v=sh472Ga7rRk
4. Lower discharge elevation for the recirculation pump piping for the raw sludge wet wells and add a bidirectional nozzle.
5. Citric Acid injection point before centrifuge.
6. Biofilter media – Biosorbens with 10 year life?
7. A permanent fan coil at rancho on the heating loop to remove heat if needed.
8. A backup boiler at rancho.
9. Extend the heating loop to the polymer room at rancho to heat the polymer tanks. This should help the dewatering process by providing a consistent temp on the polymer.
10. Rain Gutter
11. replace agitators
12. add overhead crane to digester 3 building

Tapia:

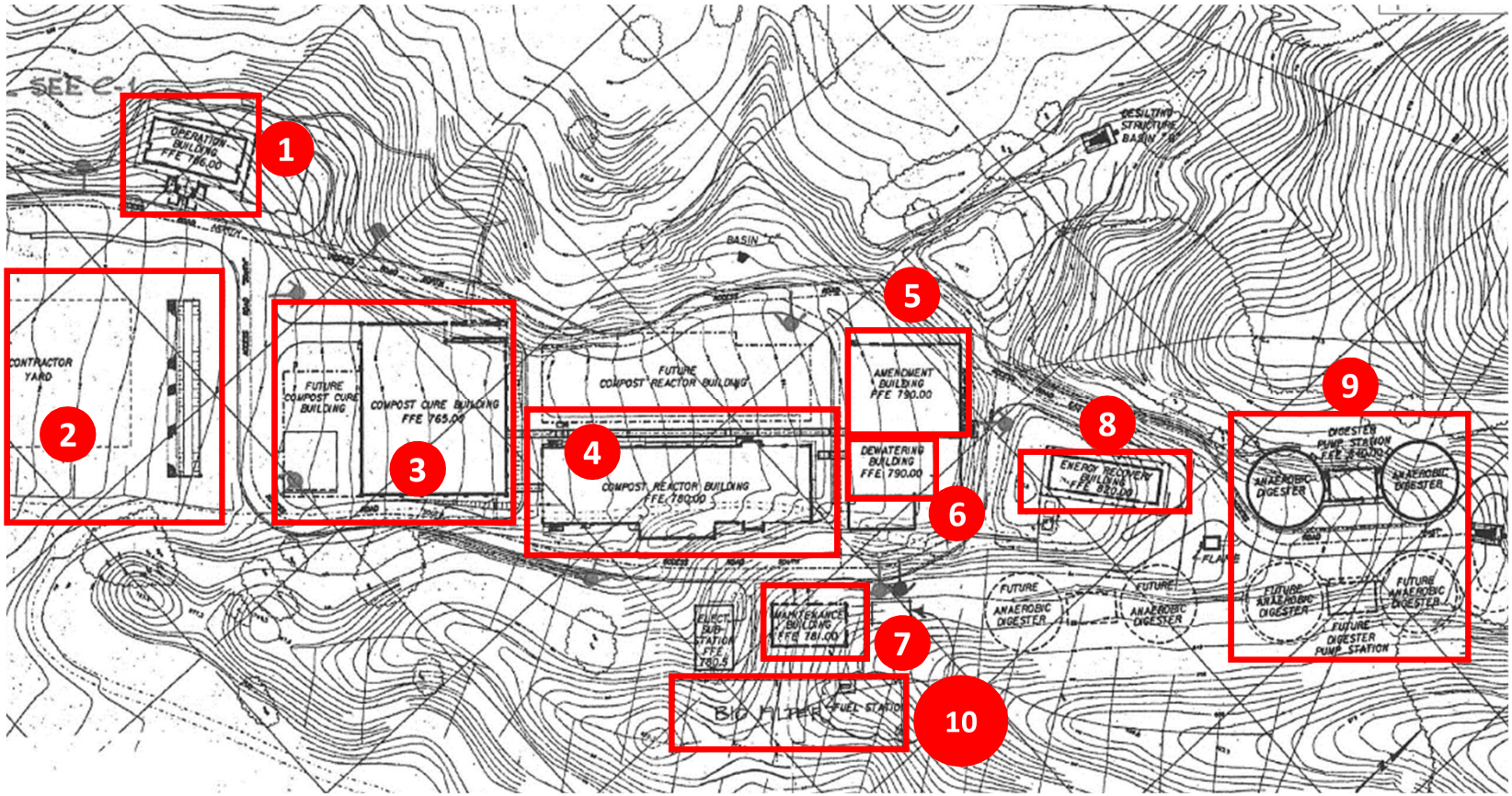
1. 4160 in effluent wet well relocation.
2. Reline effluent wet well and effluent pond
3. Tapia sludge wet well recirculation pumps and piping replacement
4. Sodium hypochlorite feeder line replacement
5. Aeration tank v-notch gate replacement
6. Grit – remove jet mix system and replace with diffusers
7. RAS pump station replacement
8. Tapia flow metering – retreat, effluent 001 and 003. Groundwater (permit required)
9. Alum pumps and metering (meter does not work).
10. Create master drawing set for Tapia Get CAD.
11. Electronic O&M Manuals
12. Alum Meter and pumps repair/ replace
13. Screen combined sludge to remove trash
14. NSEW galley plant drain line leaks
15. Filter concrete repair
16. Remove old aerobic digester air piping not in use
17. Galvanized water lines are corroding – replace
18. Replace channel air mixing piping in feed channels to aeration basins (the ones that were not replaced previously).
19. General painting in plant – piping
20. Admin. Building remodel
21. Paving
22. Landscaping

23. New switchgear, including transformers, relay test equipment, power monitoring and possibly upgrading the plant's internal feeders (if they are old and compromised).
24. Telemetry infrastructure – ie, conduits, wiring, fiber optic lines. I think we have a bunch of old/blocked/corroded conduits. It may be time to put in a new and redundant data hi-way (most likely conduits) with the ability to re-route and branch off as needed.
25. Beef up security with plenty of cameras and microphones, motion sensors Inside the buildings and on the grounds (bandwidth) in pump rooms and galleries so ops can look and listen in remotely to the various equipment.
26. Re-key the plant and place as many access points (doors/gates) on the FOB system.
27. Redesigned RAS pumping system – probably new wet-well (location too?) pumps, motors, VFDs, etc.
28. Remove all of the filter "junk controls" and cabinets up on the second floor deck. Make sure everything is de-activated, removed and then upgraded as needed and placed on the PLCs. Take a close look at the PLCs in the basement. Is this a good location for them? What about flooding?
29. Headworks – Remove all old hoist beams, brackets, etc. leave useable overhead hoist beams In dewatering.
    Put a placeholder in to replace barscreens at some point. Note: Tillman loves their travelling inlet screens. Virtually zero maintenance compared to the ones we have.
30. Flow equalization at various process locations. If designed properly, will increase reliability and greatly lower operating (electrical) costs.
31. Look at primary sludge handling drives, upgrade as required especially if parts are going to be hard to find, newer drives are much smaller, energy efficient and have better safety devices (ie, torque, missing flights.)
32. Perform destructive testing on sludge lines from Tapia to Rancho and set up on PM schedule to repeat.
33. Administration building A/C unit(s), including air handlers, exhaust fans should that system be upgraded/replaced?
34. Modernize the Tapia control room.
35. Modernize (or demo) the Tapia lab and/or move to Rancho lab.
36. Organize the "junk room" in Tapia's basement
37. Re-model the Tapia locker room/restroom(s). Make sure we have adequate lodgings for additional female staff (ops, Lab, etc.?).
38. Re-model the Tapia lunchroom
39. Gut and/or knock down some of the old (process) buildings ie; old sludge filter press and screening room
40. Remove or re-purpose the chlorine room (the one with the wood ceiling).
41. Look closely at chemical tanks. Some may have reached or will reach their expected life, replace as needed.
42. Switchgear at Tapia.
43. Replace Delta transformers with Wye.
44. Re-feed Tapia with 16Kv X 4160.
45. External wireless network for potential future SCADA tablet system.
46. Replace all access control with increased security feature. (both plants)
47. Replace influent submersible pump. Replace all influent pumps with good submersibles.
48. RFid Reader for vehicles

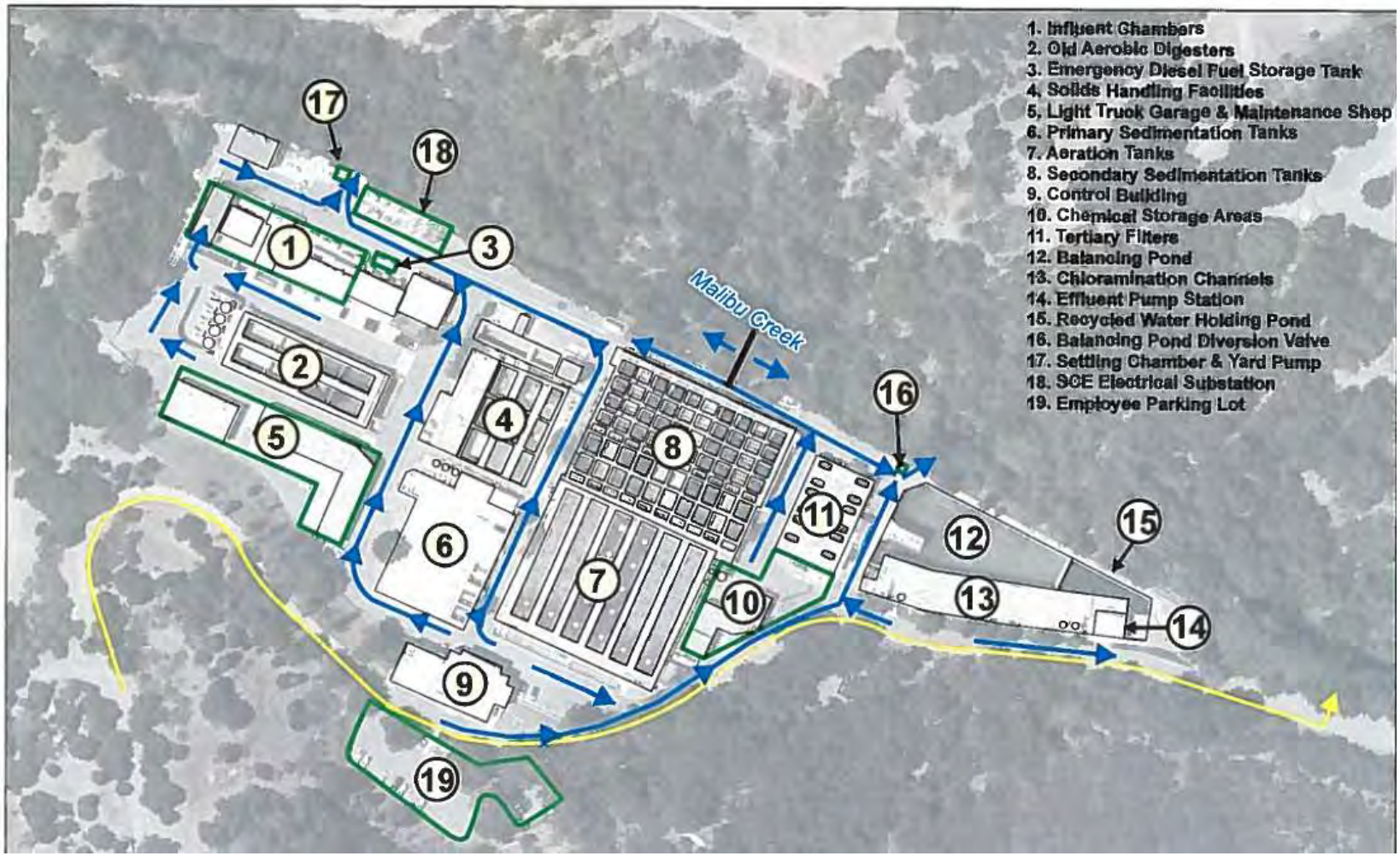
APPENDIX B
PROJECT AREAS

Rancho Facility Areas

	Process Area
1	Operations Bldg
2	Contractor Yard
3	Cure Bldg
4	Reactor Bldg
5	Amendment Bldg
6	Dewatering Bldg
7	Maintenance Bldg
8	Energy Recovery
9	Digesters
10	Bio Filter



Tapia Facility Areas



APPENDIX C
POTENTIAL CIP PROJECTS

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Potential CIP Projects

MARCH 2018

PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
							4	3	2	1		Cost/ Unit	Units	Cost
15	R-2	Contractor Yard	C	Design the replacement of the two existing storm water diversion structures to meet the Districts operational desires. Install an emergency gate valve to contain runoff overflowing to the V-ditch. These should be completed prior to the **Pavement Restoration Project CIP 60033 scheduled for FY18/19.**	The two existing storm water diversion structures along the plant access road have settlement and cracking issues. The storm water diversion structures capture runoff water from the Composting facility and direct this water to either the "fields" or to the V-ditch. The V-ditch directs water to the creek. There are two storm water diversion structures, one north and one south. The south storm water diversion structure discharge area typically starts to "backup" with runoff water due to the clogging of the outlet area with leaves. There is a selector handle inside each storm water diversion structure that operators can use to select if they wish the runoff water to go to the "field" or if they want this water to go to the V-ditch. If the storm water diversion structure(s) accumulate enough runoff water, then this runoff water will be discharged to the V-ditch regardless of the position of the selector switch, as the water level will increase inside the structure box until it overflows over the top of the internal containment piece and then the storm water will flow to the V-ditch. Functionally the District would like most of the storm water entering the vaults to be directed to the spray fields, with a backup overflow to the storm drain. Consequence of failure score is based on overflow of sludge from facility storm water runoff to the creek. There is also concern with settling of the ground area around the top of the south storm water diversion structure which should also be addressed.	Impacts to the public and regulatory					0	$ 70,000.00	2	$ 150,000.00
38	R-5	Amendment Bldg	C	Engage conveyor supplier to acquire and install new conveyor lids that are smaller and potentially hinged with better gasketing. Approximately 250 feet of conveyors in the Amendment Bldg and 150 feet in the Cure Bldg. Conveyors are 3 feet wide. The Amendment Bin and Conveyor Modification Project (CIP 10608, FY16/17) may modify the conveyors; ensure the modified conveyors have lids that meet the needs of the operators.	Conveyor lids in the Amendment Building are large and difficult to remove; many times they are dropped and damaged. Operation/Maintenance staff want smaller or hinged segments that are more manageable to work with. The existing conveyor lids do not seal well enough to keep dust out of the process. There is dust control with an automatic fan, but there is only one hardpiped connection to the fan. All surfaces within the building are covered with a thick layer of sawdust, with a significant amount of fine dust suspended in the air space. Existing lids are bent and difficult to service. Replacement will reduce the HVAC loads.		3	2	3	3	27			$ 110,000.00
49	T-01	Influent Chambers	C	Maintain indoor monorail beams in service. Perform surface preparation and coating on monorail beams to remain. Repairs will include different levels of repairs: replace and rehab, spot repair and overcoat, and spot repair. Commission structural engineer to design beam removal and modification details. Remove monorail beams and hoists not in use and execute modification.	Headworks building has several hoist beams and brackets that are experiencing surface coating failure. Advanced corrosion of roof framing steel requires blast cleaning and re-coating, after removal of monorail steel no longer used. Score based on condition of asset, not life. Headworks building has several unused hoist beams and hoists above the loading dock adjacent to the bar screen room that are not used. Not a safety issue at this time. No access issues. Headworks constructed in 1979.		3	1	4	1	24	$ 1,000.00	90	$ 110,000.00

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Potential CIP Projects

MARCH 2018

PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
							4	3	2	1		Cost/ Unit	Units	Cost
31	T-04	Solids Handling Facilities	C	Rehabilitate ferric chloride storage area by implementing the following: 1) Stair-mounted handrail replacement with material to withstand corrosive environment; 2) structural inspection of containment wall/slab concrete; 3) Epoxy injection and/or pressure grouting of cracks as recommended by structural engineer; 4) re-coating containment area with chemically resistant product recommended for concrete protection in the environment; 5) ferric tank replacement; 6) remove and replace coating on piping and other materials.	Concrete in the ferric chloride chemical storage tank area is damaged due to the corrosive environment. Fiberglass railing in ferric chloride area is damaged and has no more coating, which presents a safety issue both from physical touch and potentially failing during use. A large crack in the south east corner of the containment area has developed probably due to settling. The root cause of these issues are expected to be leaks in the chemical tanks.		4	1	5	1	30			$ 140,000.00
88	R-All	Various	D	Combine and consolidate O&M Manuals and produce an electronic, interactive O&M Manual for the entire facility. Potentially combine with the effort for Tapia.	A contiguous set of paper O&M Manuals exists for most of the plant. The District would like to produce a true interactive, electronic O&M Manual for training new personnel, more efficient maintenance, and better documentation of new/changing O&M procedures.		1	1	1	3	12			$ 310,000.00
41	T-01	Influent Chambers	D	Conduct field inspection of approximately 14 knife gate valves ranging in size from 18-24" to determine condition of each existing valve. Design and install replacement knife gates and potential actuators. Design should include new electrical feed to new electric actuators, and control capability for remote valve operation where desired by the District. The need for this project can be eliminated if the Influent Pump Station is determined to need a redesign. Conduct the planning study to redesign the Influent PS prior to the execution of this project. For cost estimating purposes, it has been assumed that 4 valves need to be retrofitted with actuators and 4 valves need to be replaced.	Manual operation of the knife gate valves at the influent pump station is cumbersome and exacerbated by the difficulty in using chain operators. Some valves are 14+ years old except for ones that were replaced 5 years ago. All valves are operable. If there is a failure and the dry pit floods, there is no way to access and manually close the valves.		3	1	4	3	26	$ 30,000.00	4	$ 120,000.00
25	T-14	Effluent PS	D	Remove or abandon in place existing 4160 Volt feeders currently encased in the top slab of the Effluent Pump Station Wet Well, underneath the existing MCCs. Perform electrical design and replace with overhead 4160 Volt feeders. Ensure coordination with 480V switchgear improvements.	Operations staff have reported prior failures of 480 Volt feeders encased in slab concrete. Staff are concerned that the existing 4160 Volt feeder encased in the Effluent Pump Station floor slab is not accessible and poses a risk to operations if it were to fail. Effluent PS constructed in 1979; asset design life is 50 years.		5	1	4	3	34			$ 100,000.00
93	T-All	Various	D	Combine and consolidate paper O&M Manuals and produce an electronic, interactive O&M Manual. Potentially combine with the effort for Rancho.	O&M Manuals exist for most of the plant, but they are mixed between old scans and new Word documents with various formats from different decades.		1	1	1	3	12			$ 310,000.00
													TOTAL	$ 1,350,000

APPENDIX D
CURRENT CIP COORDINATION

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Current CIP Coordination

MARCH 2018

PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
							4	3	2	1		Cost/ Unit	Units	Cost
55	R-3	Cure Bldg	C	Replace existing two-piece 5'x5' sagging checkered plate hatch on LVMWD-owned electrical vault with new traffic-rated checkered plate. These should be completed prior to the Pavement Restoration Project CIP 60033 scheduled for FY18/19. Address bump in the roadway caused by vault. **include with the Pavement Restoration Project CIP 60033 scheduled for FY18/19.**	An existing District-owned electrical vault in the asphalt access road has a checkered plate cover which has significant sagging and deflection, suggesting that the cover may not have sufficient vehicle loading capacity. Some of the Edison-owned electrical vaults in the asphalt access road are elevated a few inches above the finished surface of the asphalt, which amounts to a small bump in the roadway. This is a low priority for the operators at Rancho.		3	1	3	1	22	$ 10,000.00	2	$ 30,000.00
17	R-8	Energy Recovery	P	Conduct a study to determine preferred alternative for summertime disposal of excess digester gas. Include estimates of installing a replacement flare with increased capacity. **Include with the FOG Receiving Project CIP 99911 FOG scheduled for FY18/19.**	CHP owns the cogen that operates at the facility which has proven to be unreliable. During periods of hot weather, the digesters do not need heat, but waste gas from the digesters is always produced and the heat generated by the boiler or cogen has nowhere to go. Thus, the waste gas must be burned in the flare which is physically limited to 35 scfm and permitted to 75 scfm. The District currently has a Fats, Oils, and Grease (FOG) evaluation in the IIP and the evaluation of options for digester gas handling can be included in this study.	Impacts to the public and regulatory					0			$ 30,000.00
27	T-18	SCE Electrical Substation	P	Commission electrical engineering study to identify preferred transformer and 480 Volt switchgear improvements. Key operator objectives for electrical improvements include replacing the old outdated 480 Volt switchgear, re-vamping the dual redundant 480 Volt service so there is a functional backup transformer feed to the new switchgear, and replacement of up to four existing Delta configured transformers to make the redundant 480 Volt feed to the switchgear feasible. There are two existing 4160/480 Volt Delta transformers serving Area 3, and two existing 4160/480 Volt Delta transformers serving Areas 1 and 2 which the District would like to consider replacing with Wye-configured transformers. The electrical improvements should include upgrades to make both the A Bus and the B Bus of the new switchgear generator-protected, instead of the current configuration where only A Bus is generator protected. **Include with the A/B Modification Project CIP 99975 scheduled for FY18/19.**	There are four existing Delta-configured transformers which are 4160 Volt on the input side and 480 Volt on the load side. Two of the transformers serve Areas 1 and 2, and the other two serve Area 3. The existing 480 Volt switchgear cannot be powered by these transformers, thus preventing operators from having a working redundant transformer feed to the 480 Volt switchgear. The Delta configuration is incompatible with the Wye-configured transformers which are the active feed to the 480 Volt switchgear. Furthermore, only one of the two buses in the existing switchgear is generator-protected.		5	1	3	5	34			$ 60,000.00
37	T-11	Tertiary Filters	C	Replace existing electric actuators at filter structure with new electric actuators. Program plant control system to function with both remote PLC control of actuators and local actuator control. Upgrade local controls to replace old filter annunciator panels which are currently located on the top deck of the filter structure. Potentially provide 1 local control panel for multiple filters, i.e. one local control panel per row of filters. Provide weather protection for existing controls until replacement. **Include with the Automated Filter Wash Down Project CIP 99967 scheduled for FY20/21.**	During power outages, filters must be operated manually, which requires an operator to be at the filter location.		4	1	3	3	21			$ 200,000.00
70	T-11	Tertiary Filters	C	Replace existing Flash Mixer pump base plate. **Include with the Automated Filter Wash Down Project CIP 99967 scheduled for FY20/21.**	The steel support plate for the flash mixer is corroded and needs replacement.		2	1	3	1	18			$ 5,000.00
43	T-11	Tertiary Filters	C	Tertiary Filters concrete rehabilitation. Approximately 25 locations that require a 1 square foot patching with rebar repair. Replace 45 metal plates (2' x 4') on the filter deck and fix concrete around the plates with proper joint sealer. **Include with the Automated Filter Wash Down Project CIP 99967 scheduled for FY20/21.**	Concrete top surface and concrete beam deterioration and reinforcing positioned with inadequate concrete cover requires rehabilitation by selective demolition of unsound concrete, blast cleaning, and replacement concrete including bonded deck topping to provide 2-inch clear cover over reinforcing. The metal plates on the filter deck do not fit perfectly and do not seal well. Rain water runs off the filter deck and into the filters. Most plates have cracking of concrete around the edges and joint sealer installed.		3	1	5	1	23			$ 250,000.00

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Current CIP Coordination

PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
							4	3	2	1		Cost/ Unit	Units	Cost
4	R-All	Various	P	Commission a study to identify and evaluate potential security upgrades including security cameras, microphones for equipment, motion sensors, re-key, FOB updates and intrusion alarm upgrades. Implement SCADA programming update to incorporate modified security hardware. Upgrade fiber optic system and install more fiber optic to support analog cameras and other security features. Potentially combine with the effort at Tapia. **Include evaluation with SCADA System Communication CIP 10521 FY18/19.**	The existing security system appears to be limited and existing equipment outdated. For critical public works infrastructure there are potential threats to be considered.		5	1	1	2	27			$ 30,000.00
7	T-All	Various	P	Commission a study to identify and evaluate potential security upgrades including security cameras, microphones for equipment, motion sensors, re-key, FOB updates and intrusion alarm upgrades. Implement SCADA programming update to incorporate modified security hardware. Upgrade fiber optic system and install more fiber optic to support analog cameras and other security features. Telemetry infrastructure (conduits, wiring, fiber optics), new redundant data hi-way with the ability to re-route and branch off as needed. Potentially combine with Rancho effort. **Include evaluation with SCADA System Communication CIP 10521 FY18/19.**	The existing security system appears to be limited and existing equipment outdated. For critical public works infrastructure there are potential threats to be considered.		5	1	1	2	27			$ 30,000.00
54	T-15	Various	P	Conduct a study to determine the amount and location of additional primary effluent equalization at Tapia. **Include with the Primary Effluent Equalization Project CIP 99972 scheduled for FY18/19.**	Add primary effluent equalization capacity at Tapia.		1	5	1	2	23			$ 30,000.00
94	T-All	Various	D	Provide landscaped areas with benches and general "state park architecture" for tour groups along the "parade route". **Include with the Pavement Restoration Project CIP 60032 scheduled for FY20/21.**	School tours and other tour groups do not have a dedicated area for passenger unloading and group assembly. Currently some groups get out of their vehicles/buses and assemble in the middle of the main plant access road.		1	1	1	3	12			$ 30,000.00
													TOTAL	**$695,000**

APPENDIX E
PROJECT IMPLEMENTATION
TAPIA

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Project Implementation - Tapia

MARCH 2018

Implementation Year	Project Number	PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
									4	3	2	1		Cost/ Unit	Units	Cost
18/19	T-1-3	11	T-1	Influent Chambers (adjacent)	P	Barricade two elevated pedestrian doors on the inside of the Belt Press building by welding steel beams spanning the door frames on the inside face of the frames.	These buildings are not used anymore. No desire to demo.	Safety	2		3		14			$ 5,000.00
18/19	T-1-2	8	T-1	Influent Chambers	C	Bolt down plates in the channels up/downstream of the bar screens and generally in the "white room" of the Headworks building. The estimated cost assumes in-house labor and does not include potential rehabilitation of underlying supports or replacement of plates. Include replacement of Headworks white room building floor opening steel framing.	Fiberglass floor plates that cover the channels up and downstream of the bar screens in the "white room" of the headworks building are not well secured. They offer a general walking/tripping hazard. When there is a flooding of the process, some plates float up and end up out of place. Steel framing around floor openings require shoring and replacement. Headworks constructed in 1979. Bar screens rehab in 2001. Asset life of 25 years.	Safety	3		3		18			$ 55,000.00
18/19	T-10-1	5	T-10	Chemical Storage Areas	C	Replace approximately 400 feet (each) of underground (beneath asphalt roadway) sodium hypochlorite and sodium bisulfite piping with dual containment piping and leak detection. Inspect vaults to determine where repairs are required. **This work should be completed prior to the Pavement Restoration Project (CIP 60033, FY18/19).**	Chemical lines out of the chemical building and to the two vaults include secondary containment, but do not have leak detection. Currently, one of the lines is suspected to be leaking, since the vaults appear to be filled with sodium hypochlorite. Replacement tubing is extremely difficult to pull through the secondary piping without damaging the tubing. Both sodium bisulfite and sodium hypochlorite lines need replacement.	Safety	3		5		22	$ 20.00	800	$ 16,000.00
18/19	T-1-1	2	T-1	Influent Chambers	C	The scaffolding in the Influent Pump Station should have a fall protection system should be installed.	Scaffolding is constructed and permanently placed to provide access for maintenance of the drive shafts for the two drive shaft driven influent pumps. There is no safety harness or fall protection and the floor of the scaffolding is approximately 15 feet in the air.	Safety	5		2		24			$ 30,000.00
19/20	T-14-1	14	T-14	Effluent PS	D	Develop designs for the repair and replacement improvements for the three meters, along with connecting piping and channels based on the alternatives analysis.	The three existing effluent meters at Tapia can be improved in their accuracy. There is sometimes a large measured flow difference between the combined plant influent flowrate and the combined plant effluent flowrate. The three meters with issues are: 1) Outfall 001 sonic meter measuring depth in basin; an area velocity meter in the pipe may be more appropriate. 2) Groundwater is a propeller meter which cannot be calibrated as required. Another meter type is necessary. 3) Retreat meter is a flume in a sewer line and is past its useful life.	Impacts to the public and regulatory					0			$ 60,000.00
19/20	T-14-2	6	T-14	Effluent PS	C	Add fall protection to two skylights at Effluent PS building. Install cage ladders for roof access at Headworks. Design and construct compatible roof hatches and accompanying roof modifications. Include ladder extensions for through-hatch personnel access to roof. All buildings are approximately 20 feet tall.	Sky lights require fall protection. Need roof access to Headworks for equipment maintenance. The roofs of these buildings are currently accessed, but done so without safety harnesses. Safety rating is due to access without safety equipment.	Safety	5		1		22	$ 18,000.00	2	$ 41,000.00
20/21	T-1-6	67	T-1	Influent Chambers	C	Patch and weather-proof the wall where the fourth generator was planned to be located. Inspect building materials (wood and stucco) and replace as necessary.	Stucco is cracking at the location where the fourth generator was planned to be installed. Exposed wood at the base of the wall may be damaged. Building was constructed in 1979.		2	1	3	1	18			$ 10,000.00
20/21	T-11-1	59	T-11	Tertiary Filters	C	Replace the two 1 hp aluminum sulfate pumps and install 1.5" meters for each.	Alum pumps are old and do not currently have meters. They are different sizes and must be manually dialed in and flow rates estimated.		3	2	1	2	22			$ 40,000.00
20/21	T-6-3		T-6	Primary Sedimentation Tanks	C	Repair the electrical panel in the Filter gallery. Possible coordination with CIP 10567 Tapia PLC project scheduled for 2018-20.	Electrical panel corrosion in gallery. Panel appears to be old and probably has hard wire relays and not PLC based controls.		3	1	4	1	24			$ 32,000.00

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Project Implementation - Tapia

Implementation Year	Project Number	PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
									4	3	2	1		Cost/ Unit	Units	Cost
20/21	T-All-1	45	T-All	Various	C	Perform crack repair and select replacement of concrete cradle supports. Two cradles approximately 1' x 3' x 3' tall (exposed) in size are completely cracked. Not all damaged supports are known. Ensure piping replacements that are part of facility upgrades incorporate pipe support replacements.	Concrete pipe supports throughout the facility are failing. Cracked and broken concrete pipe saddle and pipe riser curb material requires rehabilitation, including removal and replacement as needed. Last major expansion construction at Tapia was in 1990; these are the types of projects that typically require new pipelines to be installed. Above ground piping (which is assumed to include their supports) has a designed asset life of 35 years.		3	1	5	1	26			$ 20,000.00
21/22	T-All-5	100	T-All	Various	C	Active basin leak repair. Plug leaks by injecting leak sealant material.	Tertiary filter basement and other locations experiencing leaks.		1	1	1	1	10			$ 20,000.00
21/22	T-1-7	76	T-1	Influent Chambers	C	Replace the two checker plate access hatches (approximately 5' square each) on the deck on the west side of the building and provide sufficient weather-proof caulking where it meets the surrounding concrete.	Access hatches stick up presenting a tripping hazard. Caulking surrounding access hatches are not complete; water enters into these cracks.		2	1	2	1	16	$ 10,000.00	2	$ 20,000.00
21/22	T-10-3	57	T-10	Chemical Storage Areas	C	Repair the concrete, hand rails, and other damaged materials in the vicinity. Apply new epoxy floor covering. Inspect the condition of the Sodium Bisulfite tanks during improvements.	The two sodium bisulfite tanks appear to be repurposed caustic soda tanks which were refurbished as part of a 1999 project. The age of the tanks and corrosion around the tanks warrant a condition assessment. The secondary chemical containment area shows excessive deterioration, with corroding supports and concrete. The previous concrete covering is peeling heavily.		2	1	5	1	22	$ 20.00	400	$ 13,000.00
21/22	T-10-2	42	T-10	Chemical Storage Areas	C	Conduct a condition assessment of the three FRP sodium hypochlorite tanks. The assessment shall include Radiographic Inspection (RT) to reveal and quantify wall thinning, a visual observation of liner (per ASTM D2563 & ASME BPVC, Section V, Article 11) and/or Acoustic Emission test to determine delamination, resin cracking and fiber-matrix debonding. Based on the results of these tests, conduct repairs or schedule phased replacement based on anticipated remaining life.	The three FRP sodium hypochlorite tanks in the covered containment area are leaking and dried sodium is on the ground. These tanks are approximately 17 years old which is near the lower end of life expectancy (15-20 years). Due to the age and signs of leaking, a condition assessment is warranted.		4	1	3	1	26			$ 10,000.00
21/22	T-2-1	30	T-2	Various	C	For all conduit in NS/EW Galleys containing active feeders, spot repair and overcoat exterior of conduit with UV-resistant acrylic coating. Approximately 8000 total feet of 2-inch conduit.	Exposed conduits in the NS/EW galleys are beginning to show significant UV discoloration and degradation.		4	1	5	1	30	$ 750.00	40	$ 30,000.00
21/22	T-6-2	33	T-6	Primary Sedimentation Tanks	C	Replace 36" collar on primary influent piping elbow.	There is extensive corrosion around the collar beneath the primary influent piping elbow near the Primary Sedimentation Tanks.		5	1	3	1	30			$ 10,000.00
22/23	T-8-2	69	T-8	Secondary Sedimentation Tanks	C	Recoat and/or replace the 30 inlet baffle/diffuser piping inside the secondary sedimentation tanks.	Process inlet diffuser piping inside the Secondary Sedimentation Tanks are showing signs of surface corrosion.		2	1	3	1	18	$ 1,000.00	60	$ 60,000.00
22/23	T-14-4	73	T-14	Effluent PS	C	Remove and replace paint on valve piping.	Coating on valves in the Effluent PS area are in unsatisfactory condition.		2	1	3	1	18			$ 10,000.00
22/23	T-6-1	32	T-6	Primary Sedimentation Tanks	P	Commission a study on the most effective way to provide cooling for the VFDs and control panels for Force main 2 Pump Station.	The Force main 2 Pump Station is located in one of the bays of the old aerobic digesters. The VFD and controls are located in a small room above the pump station. The room has extremely poor ventilation and requires a fan to have any noticeable circulation. The VFDs and control panels are prone to overheating in this environment.		5	1	2	3	30			$ 10,000.00

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Implementation Year	Project Number	PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
									4	3	2	1		Cost/ Unit	Units	Cost
22/23	T-9-2	39	T-9	Control Bldg	P	Procure architect to evaluate potential upgrades and standardize flooring, recommend paint and wall treatments. Assess seals around windows and coating on roof for water resistance and replace as necessary. Address foundation undermining occurring on the north west side of the building on the hillside. Potentially combine this project with the Administration/Control Building HVAC project.	The Administration Building is showing signs of wear and tear and isolated examples of damage due to leaks, etc. Damaged floor tiles have swelled and are potential tripping hazards and drop ceiling tiles are discolored and stained. It appears that rain water leaks into the building. Undermining occurring on the north west side of the building's foundation. Expansion in 1991 part of RFE IV. Original construction in 1970; facility is nearing 50 year asset life.		3	1	5	2	27			$ 20,000.00
Past 2023	T-9-1	24	T-9	Control Bldg	P	Engage an HVAC engineer to assess the condition of the existing system and to provide recommendations for upgrades. As part of the study, identify which air handling units are in good or excellent condition with minimal observed repeat servicing. All other air handing units should be slated for full replacement as part of the upgrade. Rehab and replacement project should include ductwork, insulation, controls, automation, air handling unit and air balancing. Potentially combine this project with the Administration/Control Building Modification project.	Operators have noted that thermostats do not control system properly and maintenance is increasingly required. Admin building HVAC system is not effective or efficient. One of the AC units was replaced in 2007; the age of the remaining units is estimated to be past their useful life if all units were installed simultaneously and are still original.		3	4	4	2	34			$ 20,000.00
Past 2023	T-14-3	20	T-14	Effluent PS, Chloramination Channels	P	Conduct Effluent Pump Station Wet Well and Chlorination Contact Channels condition assessments. Evaluate loss of surface history and water chemistry to determine if degradation is presently on-going. Enter Balancing Pond, Recycled Water Holding Pond, North Chloramination Channels, and related structures for concrete condition evaluation and core sampling. Conduct comparison of cost and effectiveness of various lining product alternatives.	Concrete top surface decomposition of the 1979 pump Station pump deck and reported plant difficulty to isolate the wet well for observation entry require effort to drain wet well and allow safe confined space entry for assessment of channel concrete conditions. Wet well level can be isolated and pumped down to ~1 foot of total depth for inspection. Concrete top surface decomposition of the south 3-pass channel and reported plant difficulty to isolate for observation entry require effort to drain channel and allow safe confined space entry for assessment of channel concrete conditions. Level in channels can be dropped to provide ~5 feet of headspace. Constructed in 1979; asset design life is 50 years. Concrete walls of the Balancing Pond, Recycled Water Holding Pond, and related structures are not lined and display signs of etching and general degradation due to the presence of aggressive chemicals. The process has been transitioned to utilizing sodium bisulfite instead of sulfur dioxide, so it is slightly less aggressive. Need a new injection point and temporary facilities to bypass and address. Balancing Pond, Recycled Water Holding Pond, North Chloramination Channels, and related structures constructed in 1991.		5	1	4	1	32			$ 80,000.00
Past 2023	T-1-4	29	T-1	Influent Chambers	P	Conduct preliminary engineering study to upgrade the influent pump station, with consideration of the following improvements: 1) Replace all 4 pumps and motors, with dry pit submersible pumps; 2) replacement and/or re-piping of the pump station mag meters, to provide more upstream and downstream straight lengths of pipe and improve meter accuracy; 3) a capacity analysis to ensure that future peak wet weather flows are attainable with new pump selections; and 4) retrofit of the building to provide hatch access to remove the old pumps and install/maintain the new pumps through new tread plate hatches in the existing slab above the new pumps, with a monorail and overhead rolling door for truck access at existing grade. Replacement of shaft-driven pumps removes the need for the scaffolding.	The existing influent pump station has the following issues as expressed by operators: 1) Two of the four pumps have extended vertical motor shafts which are difficult to access, require increased maintenance efforts, have increased maintenance demands, and pose safety concerns while the other two were incorrectly designed for the application and required modifications to operate properly (trimmed impellers) which caused them to operate inefficiently; 2) Existing pump station mag meters have inadequate upstream and downstream straight lengths, which could cause meter inaccuracy; 3) Operators want to evaluate if pump station capacity is sufficient to meet future anticipated peak wet weather flow; 4) Pumps cannot be easily removed from building unless the building is retrofitted.		4	2	3	3	31			$ 50,000.00
Past 2023	T-8-1	34	T-8	Secondary Sedimentation Tanks	D	Repair of severely deteriorated concrete on Secondary Sedimentation basins west side deck overhang soffit.	Severe concrete soffit surface deterioration requires rehabilitation by selective demolition of unsound concrete, blast cleaning, and replacing concrete and reinforcing as needed.		4	1	5	1	30			$ 80,000.00

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Implementation Year	Project Number	PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
									4	3	2	1		Cost/ Unit	Units	Cost
Past 2023	T-1-5	46	T-1	Influent Chambers	C	Replace jet mixing piping with coarse bubble channel air diffuser system in headworks channels, both upstream and downstream of automatic bar screens. Time this with the next expected shutdown of the equipment, whether for a cleaning or CIP.	Existing jet system is not very efficient at mixing and creates mounds of grit on the floor. The channel generally needs better agitation.		1	4	4	1	25			$ 70,000.00
Past 2023	T-All-2	52	T-All	Various	C	Replace galvanized utility water lines throughout the treatment plant. Unknown lengths of pipe; estimated at 5000 feet of 3" (or smaller). Underground will remain.	Galvanized water (including reclaimed and utility water systems) are corroding and in danger of failure. Installed in 1979; most have been painted.		3	1	4	1	24	$ 18.00	5000	$ 90,000.00
Past 2023	T-2-2	56	T-2	Various	C	Replace approximately 800 feet of 8-inch Plant Drain and Recycled Water lines in NSEW galleys with lined pipe. Assess the feeds to the Plant Drain line. If sources are deemed safe and non-corrosive, install low-point drain with manual valve on the bottom of the Plant Drain line located in the NS/EW gallery.	Plant drain and recycled water lines located in the NSEW galley has pinhole leaks and is showing signs of rust/corrosion on other pipes. Water sits in the Plant Drain line causing internal corrosion and pinhole leaks.		2	1	5	1	22	$ 75.00	800	$ 65,000.00
Past 2023	T-4-1	62	T-4	Solids Handling Facilities	C	Demolish 6 sets of old diffuser piping.	Old air diffuser piping is abandoned with no plans of future use. Failure could result in injury of someone in the area, but this is a low use area. This is primarily a housekeeping issue.		2	1	4	1	20			$ 20,000.00
Past 2023	T-4-2	63	T-4	Solids Handling Facilities	C	Replace approximately 250 feet of 8" raw sludge wet well recirculation piping.	The original pumps are still installed here. Issues are minimal and pumps are operable. Piping is lined and sections are slowly being replaced. Half of the piping needs complete replacement while the other half needs coating only. Recommend replacing all.		3	1	2	1	20	$ 146.00	250	$ 36,500.00
Past 2023	T-2-3	68	T-2	Various	C	Replace approximately 400 feet of existing NSEW galley iron trench drain grates. Provide proper coating.	NSEW galley trench drain iron grates are corroded and stick up creating a tripping hazard.		1	1	5	1	18	$ 200.00	400	$ 80,000.00
Past 2023	T-13-1	71	T-13	Chloramination Channels	C	Remove valve operator for underground 18" pipe located along road.	Actuator is not used anymore. Exact purpose of valve is unknown. Valve is locked out.		1	1	5	1	18			$ 10,000.00
Past 2023	T-All-3	72	T-All	Various	C	Replace all fiberglass life rings and cabinets with entirely new systems and stainless steel hardware. Add life rings to locations that are currently lacking them (filters, around balancing pond, etc.). Approximately 50 life rings. Can phase the installation of equipment as necessary.	Fiberglass life ring cases are degrading. Corrosion evident on the mounting hardware.		2	1	3	1	18	$ 600.00	50	$ 30,000.00
Past 2023	T-2-4	77	T-2	Old Aerobic Digesters	C	Demolish and dispose of ~1000 feet of unused 6" and 8" air piping in the abandoned Aerobic Digesters.	Aerobic Digesters are abandoned and the air piping is still installed but not in use. General housekeeping and potential failure. Built in 1979; unused today.		1	1	4	1	16			$ 30,000.00
Past 2023	T-4-3	78	T-4	Solids Handling Facilities	C	Demolish and dispose of unused 6" SRT (approximately 640 feet) and 8"Raw Sludge (approximately 640 feet) lines at Sludge Reaeration Tanks.	SRT and raw sludge piping are out of service.		1	1	4	1	16			$ 40,000.00
Past 2023	T-8-3	91	T-8	Secondary Sedimentation Tanks	C	Replace thirty 3" valves; provide butterfly valves with either electric or pneumatic actuators with remote controls on top deck of existing secondaries.	Skimmer actuators and scum valves for secondary tanks currently are manual. Would like to have the ability to remotely control to exercise valves during maintenance. This is not a safety issue, but an ease of maintenance issue. Benefit of seeing scum while operating valve.		1	1	1	3	12			$ 70,000.00
Past 2023	T-All-4	92	T-All	Various	D	Develop a master drawing set for the facility.	Existing drawings of the facility are out of date and not consolidated.		1	1	1	3	12			$ 70,000.00
Past 2023	T-1-8	97	T-1	Influent Chambers	P	Conduct a study to develop a conceptual layout and approximate cost and economic benefit for a screw conveyor/elevated belt conveyor project that conveys screenings outside the building.	Ragging waste from the bar screens is captured in a plastic bag sitting on a wheel-barrow that must be manually dumped into a dumpster. One of the operators has suggested that labor effort could be saved by installing a conveyor system to take compacted screenings outside the bar screen building, instead of the current approach.		1	1	1	2	11			$ 20,000.00
Past 2023	T-2-5	98	T-2	Old Aerobic Digesters	P	Add the two Aerobic Digester Recirculation Pumps to maintenance schedule.	The original digester recirculation pumps, which are no longer in service for the digesters, are used to pull rainwater from the digesters. These pumps need to be maintained.		1	1	1	1	10			$ -

TAPIA WRF AND RANCHO COMPOSTING FACILITY
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Implementation Year	Project Number	PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
									4	3	2	1		Cost/ Unit	Units	Cost
Past 2023	T-4-4	99	T-4	Solids Handling Facilities	C	Remove two abandoned, green Hartzell fans on top of the raw sludge wet wells. Demo and cap piping where possible.	Fans are abandoned. This is a housekeeping issue.		1	1	1	1	10			$ 20,000.00
															TOTAL	**$ 1,393,500**

APPENDIX F
PROJECT IMPLEMENTATION
RANCHO

TAPIA WRF AND RANCHO COMPOSTING FACILITY
O&M Project Plan Development
Project Implementation - Rancho

MARCH 2018

Implementation Year	Project Number	PHOTO #	Process Area	Process Area	Planning/ Design/ Construction	Description	Justification	TP Type	Consequence of Failure	O&M Cost Efficiency	Condition/ Asset Life	Ease of Ops (Reliability)	Total	Cost (Costs adjusted to January 2018 dollars at 3.5% per year.)		
									4	3	2	1		Cost/ Unit	Units	Cost
18/19	R-4-1	1	R-4	Reactor Bldg	P	Inspect drop ceiling tiles and T-bars to determine if they can be repaired or must be replaced. Additionally, determine whether a corrosion-resistant harness system can be installed and if the agitators can be retrofitted to handle the potential loads from the safety system.	The suspended ceiling inside the Reactor Building is corroded because of the warm, humid environment. The T-bars are stainless steel and seem to be in acceptable condition although some are damaged. District staff stated that staff must occasionally access the interior concrete bays in the Reactor Building by climbing over the concrete walls which divide the composting bays; this may constitute a confined space entry and thus has been ranked as a safety concern. Staff may need to access the Agitator if it fails at the back end of a Reactor Building composting bay. They may need to climb over the aluminum hand railing to retrieve the failed agitator. Improving fall protection at the back of the bays is recommended.	Safety	5		2		24			$ 10,000.00
18/19	R-4-2	35	R-4	Reactor Bldg	C	Perform inspection of bolting and supports for beams and conveyors. Replace bolts and retrofit or replace supports where required. Perform surface preparation and re-coating of beams and conveyors. Remove and replace coating on steel plate embedded in concrete wall. Spot repair other areas of the facility.	There is significant visible corrosion and coating failure on the roof beams and elevated sludge conveyors at the east end of the Reactor Building where sludge enters the composting bays. Failure can result in injury.		4	1	4	1	28	$ 1,000.00	40	$ 40,000.00
18/19	R-9-3	87	R-9	Digesters	D	Design and install additional 8" digested sludge pipe header (minimum of 30 feet) and isolation valves (minimum of 9 needed) between existing digesters, pumps, and spiral heat exchangers to provide operational flexibility. Need to shut down Digesters 1/2 for this work; attempt to combine during a planned shutdown such as **Rancho Las Virgenes Digester Cleaning CIP 10565 set for 2018-19.**	Piping and valving for the Digester HEXs do not provide flexibility in operation - dedicating individual HEXs to Digesters, etc. Existing materials offer a safety/trip hazard in current location.		1	1	1	3	12			$ 40,000.00
18/19	R-All-1	18	R-All	Various	P	Conduct study to assess the size and location of a permanent generator to provide standby power to the Composting Facility for essential sludge handling functions such as digester mixing and heating. Study should also include assessment of permitting requirements. An alternative to this project could be purchasing an additional portable generator for use in other areas.	The portable generator provides necessary backup power to the Composting Facility. Operators would like to disconnect the existing outdoor, plug-in portable 300 kW generator, to make it available for use in other locations throughout the District during emergency power outages. There is a desire to make use of unused electrical infrastructure (e.g. existing Automatic Transfer Switches) to connect a permanent standby power source for operating essential sludge handling functions during an extended power outage.	Impacts to the public and regulatory					0			$ 24,000.00
19/20	R-10-1	16	R-10	Biofilter	P	Perform an Odor Control Alternatives Study to determine if replacement of the wood chips with activated carbon pellets ("biosorbens") is advisable. Alternatives study should evaluate adequacy and capacity of existing supply air facilities and the consistency of air distribution throughout the bed area. If a new alternative is selected, staged removal of the woodchips should be followed by inspection of the underlying gravel, plastic underdrain plates, and perforated pipe. Replacement or repair as necessary.	District currently has issues acquiring the media used in the biofilter; no responses on RFPs and only one vendor located in Chino is able to source the product. The elimination of the hauling and disposal of used media may increase the marketability and bidding of the project. Annual costs are $82k to change out zones 1 4 and $35k to for zones 5-6 and an additional $30k for grading and other labor costs. Odor control is very important at the facility. There is a regulatory compliance aspect of this project.		4	3		2	27			$ 30,000.00
19/20	R-5-1	10	R-5	Amendment Bldg	P	Perform study to identify solutions for dust issue in Amendment Building. Possible solutions include a possible re-vamp of the fandriven dust control system for the space (40'h x 125' x 100' = 500,000 cut space). Completion of the conveyor lid repairs may result in a smaller HVAC system required. The installation of a new bulk amendment hopper is at 100% design; this project will help to reduce dust in the building. Additionally, new gaskets for the conveyor lids are being explored. **Do not execute this project until the impact of the new hopper installation and gaskets is assessed.**	The dust control system does not appear to be adequate and breathing is not effortless. The current dust collection system pulls dust only through hard-piped connection to covered conveyor where conveyor enters the building. The only collection of dust from the ambient air is through incidental dust collection that occurs through roof exhaust intakes at ceiling level, far above the floor. For regular maintenance, perform duct cleaning to remove dust and debris from the roof exhaust system. Dust explosion creates a safety issue for ventilation.	Safety	3		1		14			$ 20,000.00

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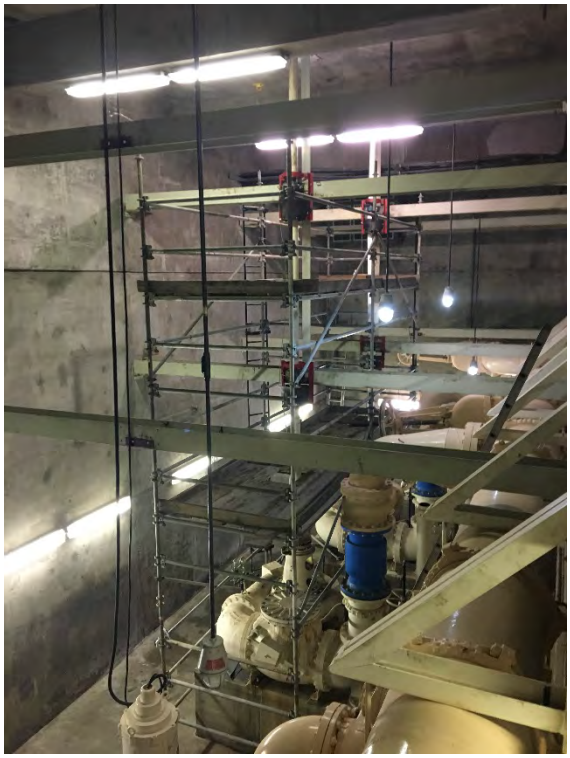
									4	3	2	1		Cost/ Unit	Units	Cost
19/20	R-6-1	53	R-6	Dewatering Bldg	D	Design and install permanent citric acid feed system with complete redundancy. Determine capacity of new system. Keep existing temporary citric skid in storage and exercise pumps periodically; provide piping for temporary citric acid skid as an additional level of redundancy.	Citric acid is currently injection downstream of the centrifuge at 5 gallons per day. The product is stored in approximately 300 gallon totes on plastic risers that offer secondary containment given a leak. Operators report that the existing system does not have sufficient capacity and request 10 gpd, minimum. Operators want a permanent citric acid storage and feed facility that doses citric acid to the centrifuge feed and helps prevent calcification inside the centrate piping downstream of the centrifuge. Existing portable pumps are 7-8 years old with a designed life of 10 years.		1	3	4	2	23			$ 60,000.00
20/21	R-6-3	64	R-6	Dewatering Bldg	C	Lower the discharge elevation of for the recirculation pump piping and add a bi-directional nozzle for the raw sludge wet wells.	Current process generates high H2S levels above the fluid level, which corrodes the exposed surfaces of the wet wells and reduces mixing efficiency. A grinder and recirculation pump will be installed as part of an ongoing CIP project, it is not expected that this will completely solve the clogging issue.		2	2	2	1	19			$ 25,000.00
20/21	R-6-4	65	R-6	Dewatering Bldg	P	Perform a bench-scale, neat polymer heating alternatives study that looks at heating tracing and insulation of the neat polymer storage tank and piping, and different types of polymer. Investigate the feasibility of the utilization of boiler waste heat or other waste heat sources onsite. Suggest a progressive cavity pump for recirculation of the polymer to reduce shearing.	Polymer used in the sludge dewatering process solidifies and "gels" in the polymer piping especially during colder months. Better mixing and increased efficiency will result.		1	3	1	3	18			$ 15,000.00
20/21	R-6-5	79	R-6	Dewatering Bldg	C	Modify the cranes and/or piping in the dewatering basement to allow unobstructed use of the crane. Suggested to lower the I-beam to below the gravity line.	Dewatering basement has a gravity line that obstructs the crane's ability to move side to side. There are two cranes, one on each side of the pipe, and they have to pass between the two.		1	2	1	3	15			$ 20,000.00
20/21	R-9-1	84	R-9	Digester Bldg	D	Perform structural design and implement beam installation or retrofit project. Structural engineer must inspect the existing 4"x12" monorail beam to determine if the beam can be dismantled, moved, and re-installed; or if a portion of the existing monorail must be removed and replaced with a new monorail beam.	The overhead crane in Digester 1 & 2 Building is offset from the center of the pumps causing difficulties when performing maintenance that requires the use of the crane.		1	1	1	4	13			$ 30,000.00
21/22	R-8-2	85	R-8	Energy Recovery	C	Construct concrete stairs (40 feet elevation) up the hillside between the Energy Recovery Building and the Dewatering Building.	Currently, operators walk down a concrete drain to walk between the two buildings. Stairs would be safer and provide quicker travel than walking along the road.		1	1	1	3	12	$ 1,000.00	40	$ 40,000.00
21/22	R-9-2	86	R-9	Digesters	D	Design and install a 1.5 ton monorail crane in Digester 3 Building similar to that which is installed in Digester Bldg 1&2.	Digester 3 Building does not have an overhead crane installed, which presents difficulties in maintaining equipment. Access with other mobile cranes or lifts is extremely difficult and places surrounding equipment and personnel in danger.		1	1	1	3	12			$ 60,000.00
22/23	R-1-1	81	R-1	Ops Bldg	C	Engage an IT professional to assess needs and procure and install packaged video conferencing hardware and software from outside IT vendor. Ensure this effort aligns with the IT Master Plan.	Tapia and Rancho facility personnel would like to have a joint morning meeting to coordinate each morning, which would increase the ease of operations. There is a desire to implement district-wide teleconferencing; ensure the system installed for the facilities support this vision. If this is independent of the IT Master Plan, ensure it aligns with it. This should be paired with, or executed with respect to, the IT Master Plan projects.		1	2	1	2	14			$ 75,000.00
															TOTAL	**$ 489,000**

APPENDIX G
PROJECT DETAILS
TAPIA

Project Number:	T-1-1	Process Area:	Influent Chambers
Project Name:	Influent PS Scaffolding Fall Protection	Project Type:	Construction

Description:

The scaffolding in the Influent Pump Station should have a fall protection system should be installed.



Justification:

Scaffolding is constructed and permanently placed to provide access for maintenance of the drive shafts for the two drive shaft driven influent pumps. There is no safety harness or fall protection and the floor of the scaffolding is approximately 15 feet in the air.

Cost Estimate:	$ 30,000

Project Number:	T-10-1	Process Area:	Chemical storage areas
Project Name:	Chemical Piping Replacement	Project Type:	Construction

Description:

Replace approximately 400 feet (each) of underground (beneath asphalt roadway) sodium hypochlorite and sodium bisulfite piping with dual containment piping and leak detection. Inspect vaults to determine where repairs are required. This work should be completed prior to the Pavement Restoration Project (CIP 60033, FY18/19).

Justification:

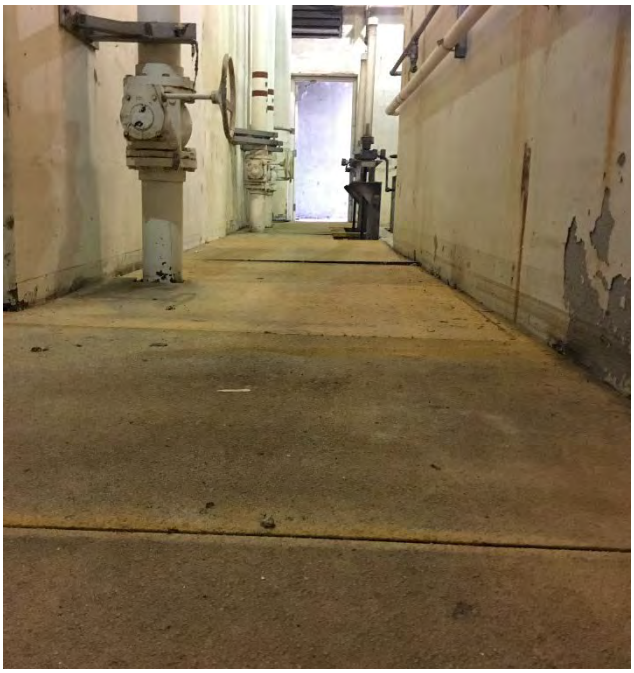
Chemical lines out of the chemical building and to the two vaults include secondary containment, but do not have leak detection. Currently, one of the lines is suspected to be leaking, since the vaults appear to be filled with sodium hypochlorite. Replacement tubing is extremely difficult to pull through the secondary piping without damaging the tubing. Both sodium bisulfite and sodium hypochlorite lines need replacement.

Cost Estimate:	$ 16,000

Project Number:	T-1-2	Process Area:	Influent Chambers
Project Name:	Whiteroom Rehabilitation	Project Type:	Construction

Description:

Bolt down plates in the channels up/downstream of the bar screens and generally in the "white room" of the Headworks building. The estimated cost assumes in-house labor and does not include potential rehabilitation of underlying supports or replacement of plates. Include replacement of Headworks white room building floor opening steel framing.



Justification:

Fiberglass floor plates that cover the channels up and downstream of the bar screens in the "white room" of the headworks building are not well secured. They offer a general walking/tripping hazard. When there is a flooding of the process, some plates float up and end up out of place. Steel framing around floor openings require shoring and replacement. Headworks constructed in 1979. Bar screens rehab in 2001. Asset life of 25 years.

Cost Estimate:	$ 55,000

Project Number:	T-1-3	Process Area:	Belt Press Building
Project Name:	Barricade Access	Project Type:	Construction

Description:

Barricade two elevated pedestrian doors on the inside of the Belt Press building by welding steel beams spanning the door frames on the inside face of the frames.

Justification:

These buildings are not used anymore. No desire to demo.

Cost Estimate:	$ 5,000

Project Number:	T-14-1	Process Area:	Effluent PS
Project Name:	Meter Replacement	Project Type:	Design

Description:

Develop designs for the repair and replacement improvements for the three meters, along with connecting piping and channels based on the alternatives analysis.

Justification:

The three existing effluent meters at Tapia can be improved in their accuracy. There is sometimes a large measured flow difference between the combined plant influent flowrate and the combined plant effluent flowrate. The three meters with issues are:

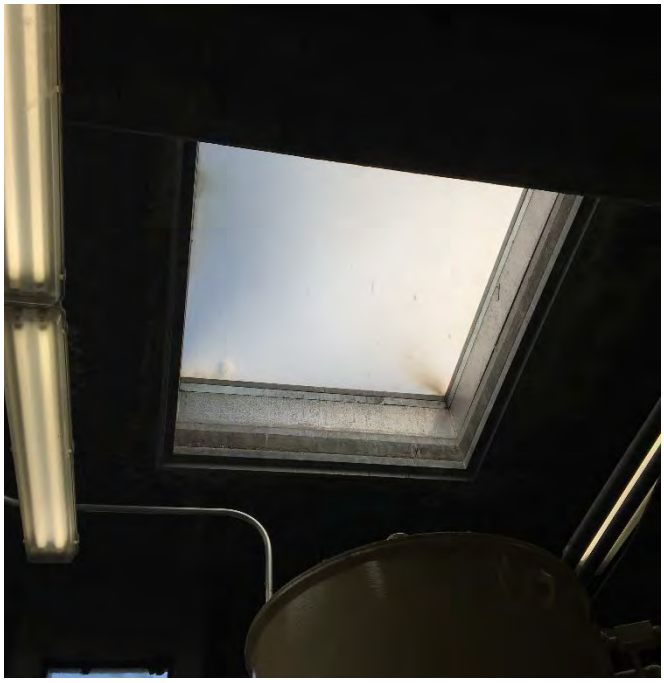
1) Outfall 001 sonic meter measuring depth in basin; an area velocity meter in the pipe may be more appropriate.
2) Groundwater is a propeller meter which cannot be calibrated as required. Another meter type is necessary.
3) Retreat meter is a flume in a sewer line and is past its useful life.

Cost Estimate:	$ 60,000

Project Number:	T-14-2	Process Area:	Effluent Pump Station
Project Name:	Fall Protection	Project Type:	Construction

Description:

Add fall protection to two skylights at Effluent PS building. Install cage ladders for roof access at Headworks. Design and construct compatible roof hatches and accompanying roof modifications. Include ladder extensions for through-hatch personnel access to roof. All buildings are approximately 20 feet tall.



Justification:

Sky lights require fall protection. Need roof access to Headworks for equipment maintenance. The roofs of these buildings are currently accessed but done so without safety harnesses. Safety rating is due to access without safety equipment.

Cost Estimate:	$ 41,000

Project Number:	T-1-6	Process Area:	Influent Chambers
Project Name:	Building Exterior Rehabilitation	Project Type:	Construction

Description:

Patch and weather-proof the wall where the fourth generator was planned to be located. Inspect building materials (wood and stucco) and replace as necessary.

Justification:

Stucco is cracking at the location where the fourth generator was planned to be installed. Exposed wood at the base of the wall may be damaged. Building was constructed in 1979.

Cost Estimate:	$ 10,000

Project Number:	T-ALL-1	Process Area:	Various
Project Name:	Concrete Support Replacement	Project Type:	Construction

Description:

Perform crack repair and select replacement of concrete cradle supports. Two cradles approximately 1' x 3' x 3' tall (exposed) in size are completely cracked. Not all damaged supports are known. Ensure piping replacements that are part of facility upgrades incorporate pipe support replacements.

Justification:

Concrete pipe supports throughout the facility are failing. Cracked and broken concrete pipe saddle and pipe riser curb material requires rehabilitation, including removal and replacement as needed. Last major expansion construction at Tapia was in 1990; these are the types of projects that typically require new pipelines to be installed. Above ground piping (which is assumed to include their supports) has a designed asset life of 35 years.

Cost Estimate:	$ 20,000

Project Number:	T-11-1	Process Area:	Tertiary Filters
Project Name:	Aluminum Sulfate Pump Replacement	Project Type:	Construction

Description:

Replace the two 1 hp aluminum sulfate pumps and install 1.5" meters for each.

Justification:

Alum pumps are old and do not currently have meters. They are different sizes and must be manually dialed in and flow rates estimated.

Cost Estimate:	$ 40,000

Project Number:	T-6-3	Process Area:	Primary Sedimentation Tanks
Project Name:	Filter Gallery Panel Replacement	Project Type:	Construction

Description:

Repair the electrical panel in the Filter gallery. Possible coordination with CIP 10567 Tapia PLC project scheduled for 2018-20.

Justification:

Electrical panel corrosion in gallery. Panel appears to be old and probably has hard wire relays and not PLC based controls.

Cost Estimate:	$ 32,000

Project Number:	T-1-7	Process Area:	Influent Chambers
Project Name:	Access Hatch Rehabilitation	Project Type:	Construction

Description:

Replace the two checker plate access hatches (approximately 5' square each) on the deck on the west side of the building and provide sufficient weather-proof caulking where it meets the surrounding concrete.

Justification:

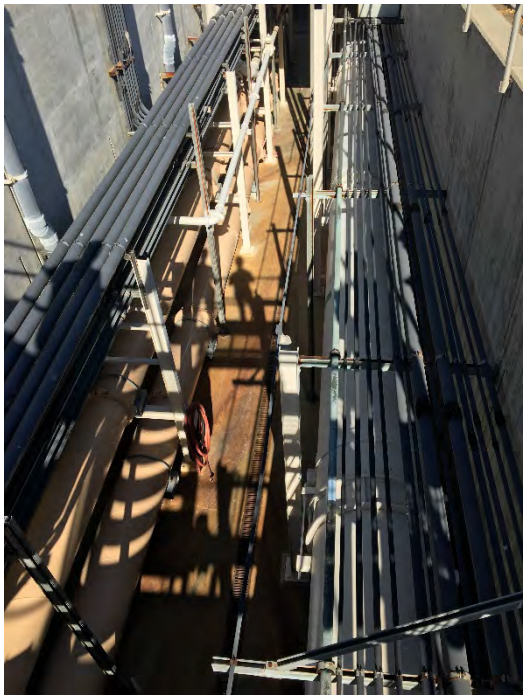
Access hatches stick up presenting a tripping hazard. Caulking surrounding access hatches are not complete; water enters these cracks.

Cost Estimate:	$ 20,000

Project Number:	T-2-1	Process Area:	Various
Project Name:	NS/EW Galley Rehabilitation	Project Type:	Construction

Description:

For all conduit in NS/EW Galleys containing active feeders, spot repair and overcoat exterior of conduit with UV-resistant acrylic coating. Approximately 8000 total feet of 2-inch conduit.



Justification:

Exposed conduits in the NS/EW galleys are beginning to show significant UV discoloration and degradation.

Cost Estimate:	$ 30,000

Project Number:	T-6-2	Process Area:	Primary Sedimentation Tanks
Project Name:	36-inch Primary Influent Collar Replacement	Project Type:	Construction

Description:

Replace 36" collar on primary influent piping elbow.

Justification:

There is extensive corrosion around the collar beneath the primary influent piping elbow near the Primary Sedimentation Tanks.

Cost Estimate:	$ 10,000

Project Number:	T-ALL-5	Process Area:	Various
Project Name:	Basin Leak Repair	Project Type:	Construction

Description:

Active basin leak repair. Plug leaks by injecting leak sealant material.

Justification:

Tertiary filter basement and other locations experiencing leaks.

Cost Estimate:	$ 20,000

Project Number:	T-10-2	Process Area:	Chemical Storage Areas
Project Name:	Sodium Hypo Tanks Condition Assessment	Project Type:	Construction

Description:

Conduct a condition assessment of the three FRP sodium hypochlorite tanks. The assessment shall include Radiographic Inspection (RT) to reveal and quantify wall thinning, a visual observation of liner (per ASTM D2563 & ASME BPVC, Section V, Article 11) and/or Acoustic Emission test to determine delamination, resin cracking and fiber-matrix debonding. Based on the results of these tests, conduct repairs or schedule phased replacement based on anticipated remaining life.

Justification:

The three FRP sodium hypochlorite tanks in the covered containment area are leaking and dried sodium is on the ground. These tanks are approximately 17 years old which is near the lower end of life expectancy (15-20 years). Due to the age and signs of leaking, a condition assessment is warranted.

Cost Estimate:	$ 10,000

Project Number:	T-10-3	Process Area:	Chemical Storage Areas
Project Name:	Sodium Bisulfite Chemical Area Rehabilitation	Project Type:	Construction

Description:

Repair the concrete, hand rails, and other damaged materials in the vicinity. Apply new epoxy floor covering. Inspect the condition of the Sodium Bisulfite tanks during improvements.

Justification:

The two sodium bisulfite tanks appear to be repurposed caustic soda tanks which were refurbished as part of a 1999 project. The age of the tanks and corrosion around the tanks warrant a condition assessment. The secondary chemical containment area shows excessive deterioration, with corroding supports and concrete. The previous concrete covering is peeling heavily.

Cost Estimate:	$ 13,000

Project Number:	T-8-2	Process Area:	Secondary Sedimentation Tanks
Project Name:	Baffle/Diffuser Piping Coating	Project Type:	Construction

Description:

Recoat and/or replace the 30 inlet baffle/diffuser piping inside the secondary sedimentation tanks.

Justification:

Process inlet diffuser piping inside the Secondary Sedimentation Tanks are showing signs of surface corrosion.

Cost Estimate:	$ 60,000

Project Number:	T-14-4	Process Area:	Effluent PS
Project Name:	Valve Coating	Project Type:	Construction

Description:

Remove and replace paint on valve piping.

Justification:

Coating on valves in the Effluent PS area are in unsatisfactory condition.

Cost Estimate:	$ 10,000

Project Number:	T-6-1	Process Area:	Primary Sedimentation Tanks
Project Name:	VFD Cooling	Project Type:	Planning

Description:

Commission a study on the most effective way to provide cooling for the VFDs and control panels for Force main 2 Pump Station.

Justification:

The Force main 2 Pump Station is located in one of the bays of the old aerobic digesters. The VFD and controls are located in a small room above the pump station. The room has extremely poor ventilation and requires a fan to have any noticeable circulation. The VFDs and control panels are prone to overheating in this environment.

Cost Estimate:	$ 10,000

Project Number:	T-9-2	Process Area:	Control Building
Project Name:	Control Building Interior Evaluation	Project Type:	Planning

Description:

Procure architect to evaluate potential upgrades and standardize flooring, recommend paint and wall treatments. Assess seals around windows and coating on roof for water resistance and replace as necessary. Address foundation undermining occurring on the north west side of the building on the hillside. Potentially combine this project with the Administration/Control Building HVAC project.

Justification:

The Administration Building is showing signs of wear and tear and isolated examples of damage due to leaks, etc. Damaged floor tiles have swelled and are potential tripping hazards and drop ceiling tiles are discolored and stained. It appears that rain water leaks into the building. Undermining occurring on the north west side of the building's foundation. Expansion in 1991 part of RFE IV. Original construction in 1970; facility is nearing 50-year asset life.

Cost Estimate:	$ 20,000

APPENDIX H
PROJECT DETAILS
RANCHO

Project Number:	R-4-1	Process Area:	Reactor Building
Project Name:	Reactor Building Rehab and Safety System	Project Type:	Planning

Description:

Inspect drop ceiling tiles and T-bars to determine if they can be repaired or must be replaced. Additionally, determine whether a corrosion-resistant harness system can be installed and if the agitators can be retrofitted to handle the potential loads from the safety system.

Justification:

The suspended ceiling inside the Reactor Building is corroded because of the warm, humid environment. The T-bars are stainless steel and seem to be in acceptable condition although some are damaged. District staff stated that staff must occasionally access the interior concrete bays in the Reactor Building by climbing over the concrete walls which divide the composting bays; this may constitute a confined space entry and thus has been ranked as a safety concern. Staff may need to access the Agitator if it fails at the back end of a Reactor Building composting bay. They may need to climb over the aluminum hand railing to retrieve the failed agitator. Improving fall protection at the back of the bays is recommended.

Cost Estimate:	$ 10,000

Project Number:	R-4-2	Process Area:	Reactor Building
Project Name:	Conveyor Structural Supports	Project Type:	Construction

Description:

Perform inspection of bolting and supports for beams and conveyors. Replace bolts and retrofit or replace supports where required. Perform surface preparation and re-coating of beams and conveyors. Remove and replace coating on steel plate embedded in concrete wall. Spot repair other areas of the facility.

Justification:

There is significant visible corrosion and coating failure on the roof beams and elevated sludge conveyors at the east end of the Reactor Building where sludge enters the composting bays. Failure can result in injury.

Cost Estimate:	$ 40,000

Project Number:	R-9-3	Process Area:	Digesters
Project Name:	Digester HEX Piping	Project Type:	Design

Description:

Design and install additional 8" digested sludge pipe header (minimum of 30 feet) and isolation valves (minimum of 9 needed) between existing digesters, pumps, and spiral heat exchangers to provide operational flexibility. Need to shut down Digesters 1/2 for this work; attempt to combine during a planned shutdown such as Rancho Las Virgenes Digester Cleaning CIP 10565 set for 2018-19.

Justification:

Piping and valving for the Digester HEXs do not provide flexibility in operation - dedicating individual HEXs to Digesters, etc. Existing materials offer a safety/trip hazard in current location.

Cost Estimate:	$ 40,000

Project Number:	R-ALL-1	Process Area:	Various
Project Name:	Permanent Generator	Project Type:	Planning

Description:

Conduct study to assess the size and location of a permanent generator to provide standby power to the Composting Facility for essential sludge handling functions such as digester mixing and heating. Study should also include assessment of permitting requirements. An alternative to this project could be purchasing an additional portable generator for use in other areas.

Justification:

The portable generator provides necessary backup power to the Composting Facility. Operators would like to disconnect the existing outdoor, plug-in portable 300 kW generator, to make it available for use in other locations throughout the District during emergency power outages. There is a desire to make use of unused electrical infrastructure (e.g. existing Automatic Transfer Switches) to connect a permanent standby power source for operating essential sludge handling functions during an extended power outage.

Cost Estimate:	$ 24,000

Project Number:	R-10-1	Process Area:	Biofilter
Project Name:	Odor Control Alternatives Study	Project Type:	Planning

Description:

Perform an Odor Control Alternatives Study to determine if replacement of the wood chips with activated carbon pellets ("biosorbens") is advisable. Alternatives study should evaluate adequacy and capacity of existing supply air facilities and the consistency of air distribution throughout the bed area. If a new alternative is selected, staged removal of the woodchips should be followed by inspection of the underlying gravel, plastic underdrain plates, and perforated pipe. Replacement or repair as necessary.

Justification:

District currently has issues acquiring the media used in the biofilter; no responses on RFPs and only one vendor located in Chino can source the product. The elimination of the hauling and disposal of used media may increase the marketability and bidding of the project. Annual costs are $82k to change out zones 1 4 and $35k to for zones 5-6 and an additional $30k for grading and other labor costs. Odor control is very important at the facility. There is a regulatory compliance aspect of this project.

Cost Estimate:	$ 30,000

Project Number:	R-5-1	Process Area:	Amendment Building
Project Name:	Dust Control	Project Type:	Planning

Description:

Perform study to identify solutions for dust issue in Amendment Building. Possible solutions include a possible re-vamp of the fan driven dust control system for the space (40'h x 125' x 100' = 500,000 cut space). Completion of the conveyor lid repairs may result in a smaller HVAC system required. The installation of a new bulk amendment hopper is at 100% design; this project will help to reduce dust in the building. Additionally, new gaskets for the conveyor lids are being explored. Do not execute this project until the impact of the new hopper installation and gaskets is assessed.

Justification:

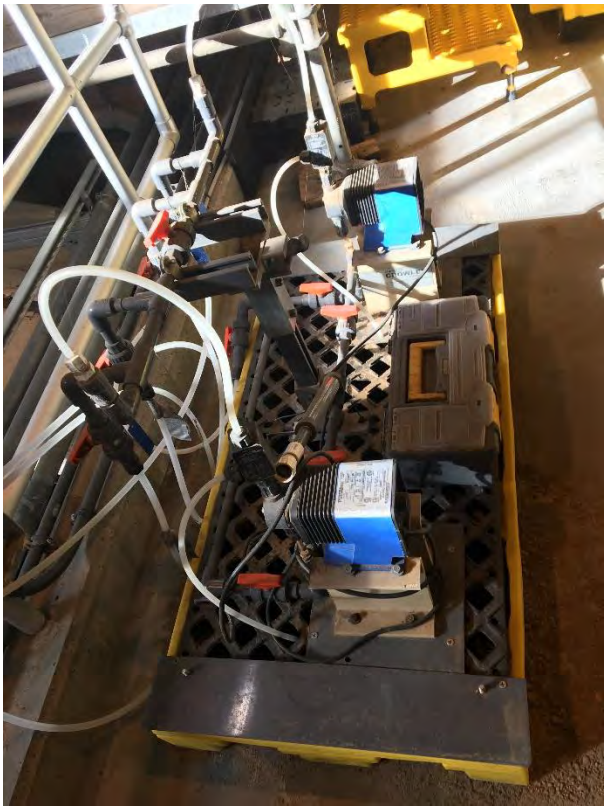
The dust control system does not appear to be adequate and breathing is not effortless. The current dust collection system pulls dust only through hard-piped connection to covered conveyor where conveyor enters the building. The only collection of dust from the ambient air is through incidental dust collection that occurs through roof exhaust intakes at ceiling level, far above the floor. For regular maintenance, perform duct cleaning to remove dust and debris from the roof exhaust system. Dust explosion creates a safety issue for ventilation.

Cost Estimate:	$ 20,000

Project Number:	R-6-1	Process Area:	Dewatering Building
Project Name:	Citric Acid Feed System	Project Type:	Design

Description:

Design and install permanent citric acid feed system with complete redundancy. Determine capacity of new system. Keep existing temporary citric skid in storage and exercise pumps periodically; provide piping for temporary citric acid skid as an additional level of redundancy.



Justification:

Citric acid is currently injection downstream of the centrifuge at 5 gallons per day. The product is stored in approximately 300-gallon totes on plastic risers that offer secondary containment given a leak. Operators report that the existing system does not have sufficient capacity and request 10 gpd, minimum. Operators want a permanent citric acid storage and feed facility that doses citric acid to the centrifuge feed and helps prevent calcification inside the centrate piping downstream of the centrifuge. Existing portable pumps are 7-8 years old with a designed life of 10 years.

Cost Estimate:	$ 60,000

Project Number:	R-6-3	Process Area:	Dewatering Building
Project Name:	Recirculation Pump	Project Type:	Construction

Description:

Lower the discharge elevation of for the recirculation pump piping and add a bi-directional nozzle for the raw sludge wet wells.

Justification:

Current process generates high H2S levels above the fluid level, which corrodes the exposed surfaces of the wet wells and reduces mixing efficiency. A grinder and recirculation pump will be installed as part of an ongoing CIP project, it is not expected that this will completely solve the clogging issue.

Cost Estimate:	$ 25,000

Project Number:	R-6-4	Process Area:	Dewatering Building
Project Name:	Polymer Evaluation	Project Type:	Planning

Description:

Perform a bench-scale, neat polymer heating alternatives study that looks at heating tracing and insulation of the neat polymer storage tank and piping, and different types of polymer. Investigate the feasibility of the utilization of boiler waste heat or other waste heat sources onsite. Suggest a progressive cavity pump for recirculation of the polymer to reduce shearing.

Justification:

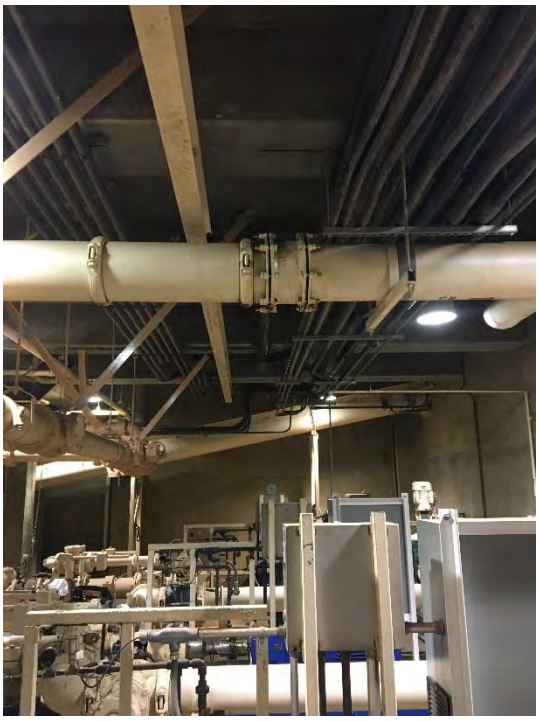
Polymer used in the sludge dewatering process solidifies and "gels" in the polymer piping especially during colder months. Better mixing and increased efficiency will result.

Cost Estimate:	$ 15,000

Project Number:	R-6-5	Process Area:	Dewatering Building
Project Name:	Crane Modification	Project Type:	Construction

Description:

Modify the cranes and/or piping in the dewatering basement to allow unobstructed use of the crane. Suggested to lower the I-beam to below the gravity line.



Justification:

Dewatering basement has a gravity line that obstructs the crane's ability to move side to side. There are two cranes, one on each side of the pipe, and they must pass between the two.

Cost Estimate:	$ 20,000

Project Number:	R-9-1	Process Area:	Digester Building
Project Name:	Beam Retrofit	Project Type:	Design

Description:

Perform structural design and implement beam installation or retrofit project. Structural engineer must inspect the existing 4"x12" monorail beam to determine if the beam can be dismantled, moved, and re-installed; or if a portion of the existing monorail must be removed and replaced with a new monorail beam.

Justification:

The overhead crane in Digester 1 & 2 Building is offset from the center of the pumps causing difficulties when performing maintenance that requires the use of the crane.

Cost Estimate:	$ 30,000

Project Number:	R-8-2	Process Area:	Energy Recovery
Project Name:	Access Stairs	Project Type:	Construction

Description:

Construct concrete stairs (40 feet elevation) up the hillside between the Energy Recovery Building and the Dewatering Building.

Justification:

Currently, operators walk down a concrete drain to walk between the two buildings. Stairs would be safer and provide quicker travel than walking along the road.

Cost Estimate:	$ 40,000

Project Number:	R-9-2	Process Area:	Digester Building
Project Name:	Install Monorail Crane	Project Type:	Design

Description:

Design and install a 1.5-ton monorail crane in Digester 3 Building similar to that which is installed in Digester Bldg. 1&2.

Justification:

Digester 3 Building does not have an overhead crane installed, which presents difficulties in maintaining equipment. Access with other mobile cranes or lifts is difficult and places surrounding equipment and personnel in danger.

Cost Estimate:	$ 60,000

Project Number:	R-1-1	Process Area:	Operations Building
Project Name:	Communications Platform	Project Type:	Construction

Description:

Engage an IT professional to assess needs and procure and install packaged video conferencing hardware and software from outside IT vendor. Ensure this effort aligns with the IT Master Plan.

Justification:

Tapia and Rancho facility personnel would like to have a joint morning meeting to coordinate each morning, which would increase the ease of operations. There is a desire to implement district-wide teleconferencing; ensure the system installed for the facilities support this vision. If this is independent of the IT Master Plan, ensure it aligns with it. This should be paired with, or executed with respect to, the IT Master Plan projects.

Cost Estimate:	$ 75,000

ITEM 10B

INFORMATION ONLY

May 7, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Tapia Water Reclamation Facility Chloride Study: Investigation Report

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SUMMARY:

On November 6, 2017, the JPA Board accepted a proposal from Larry Walker Associates, Inc. (LWA), to perform the Tapia Water Reclamation Facility Chloride Study. The study is required by a Time Schedule Order (TSO) in the 2017 Tapia NPDES Permit. The purpose of the study is to evaluate and address levels of chloride discharged from Tapia to the Los Angeles River. The Los Angeles River discharge concentration limit for chlorides will be reduced from 190 to 150 mg/L, effective August 1, 2022, unless the regulatory limited is amended by the Los Angeles Regional Water Quality Control Board (LARWQCB).

Attached is a copy of the Chloride Investigation Report, which is the first of four reports included in LWA's scope of work. The report was submitted to the LARWQB by the regulatory deadline on April 1, 2018. The report examines historical chloride levels in the potable water supplied to the JPA's service area and Tapia's effluent, together with an evaluation of other sources of chloride and their impact on effluent concentrations. It was found that the most significant sources of chloride were the potable water supply and, potentially, residential self-regenerating water softeners. Sodium hypochlorite, which is used for disinfection, was found to comprise the most significant in-plant source of chloride.

Options to reduce chloride concentrations are limited since much of the loading comes from the potable supply for the JPA's service area. However, the report includes recommendations to reduce the load from self-regenerating water softeners.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

On November 6, 2017, the JPA Board approved an appropriation of $100,000 for the work.

The cost of the study is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District.

DISCUSSION:

In 1999, Tapia began periodically discharging its treated effluent to the Los Angeles River to comply with a prohibition on discharges to Malibu Creek from April 15th to November 15th each year. Discharges to the Los Angeles River were originally permitted under NPDES Order No. 99-066, which prescribed a chloride limit of 190 mg/L rather than the 150 mg/L Basin Plan Water Quality Objective. The rationale for the higher chloride limit was LARWQCB Resolution No. 97-02 that revised the chloride limit from 150 mg/L to 190 mg/L for various surface waters, including certain reaches of the Los Angeles River, due to the impacts of drought on chloride levels in potable source waters. The 190 mg/L chloride limit for discharge has been maintained in all subsequent permits for Tapia based on the same rationale.

During the renewal of Tapia's NPDES permit, LARWQCB staff discovered that the long-standing application of Resolution No. 97-02 was in error because it only covered the portions of the Los Angeles River downstream of the Sepulveda Flood Control Basin and Tapia's discharge occurs upstream. The reason that the 1997 Resolution did not include the portions of the Los Angeles River upstream of Sepulveda Flood Control Basin is because there were no discharges upstream of the Tillman Water Reclamation Plant, which is adjacent the Sepulveda Flood Control Basin, at that time. Tapia's permitted-discharges to the upstream reach of the Los Angeles River did not begin until two years later in 1999.

Tapia's discharge to the Los Angeles River is vital to the success of the Pure Water Project Las Virgenes-Triunfo. The new NPDES permit has stipulations that allow for discharge to Malibu Creek during heavy rain events when daily flows exceed 11 MGD. The rationale for the 11 MGD trigger point was that 6 MGD could be sent to the advanced water treatment facility and 5 MGD could be pumped to the Los Angeles River. If the option to discharge to the Los Angeles River is not available, then the capacity to dispose of excess effluent during heavy rain events is reduced to 6 MGD. Additionally, discharge to the Los Angeles River may also be necessary to dispose of small amounts of effluent when there is not enough water available to start up and maintain operation of the advanced water treatment plant.

During the draft permit comment period, JPA staff requested that the LARWQCB issue a Time schedule Order (TSO), which would culminate in a proposed Basin Plan Amendment. At the June 1, 2017 permit hearing, the LARWQCB issued a TSO, which requires a study containing six sub-reports. These reports include: an investigation into chloride sources, an evaluation of the impact of chloride levels and source control, an identification of options to address compliance including regulatory remedies, a recommendation, Implementation, and confirmation of compliance. Larry Walker Associates, Inc. was retained to complete the first four of these sub-reports.

The investigation report was completed by LWA and submitted to the LARWQCB before the April 1, 2018 deadline. In the report, it was shown that chloride levels in the potable water supplied to the JPA's service area have gradually increased since 2005, and that chloride levels in Tapia's discharge have increased correspondingly. The report determined that the most significant influent sources of chloride include the potable water supply, which is estimated to contribute 46% of effluent chloride load from Tapia and, potentially, residential water softeners (water softener load is based upon an estimate of softeners in the service

area), which are estimated to contribute 22% of effluent chloride load. Unlike potable water supply, residential water softeners are considered a controllable source. Options to reduce the use self-generating water softeners and associated chloride discharges include the following:

- Public outreach and education regarding the water quality impacts of water softeners and encouraging residents to voluntarily stop using water softeners to or to switch to non-salt discharging alternatives.

- Ordinances banning or restricting residential self-generating water softeners. (Both LVMWD and TSD have ordinances banning brines produced in the regeneration of water softeners from being discharged into the sewer system.)

- Rebates or other financial incentives for residents to remove self-generating water softeners.

Sodium hypochlorite used for disinfection comprises the majority of in-plant chloride sources, which contribute an estimated 11% to the chloride load. Loads from sodium hypochlorite use can be reduced through conversion to ultraviolet light or other non-chlorine disinfection methods.

Prepared by: Brett Dingman, Water Reclamation Manager

ATTACHMENTS:

Tapia Water Reclamation Facility Chloride Study - Investigation Report

APRIL 1, 2018

LAS VIRGENES MUNICIPAL WATER DISTRICT

Chloride Source Investigation Report

Prepared by:
LARRY WALKER ASSOCIATES

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1 Introduction

Tapia Water Reclamation Facility (WRF) is owned and operated by the Las Virgenes – Triunfo Joint Powers Authority (JPA), which consists of the Las Virgenes Municipal Water District (LVWMD) and Triunfo Sanitation District. The Tapia WRF discharges tertiary treated wastewater primarily to Malibu Creek (Discharge Point 001) and occasionally to the Los Angeles (LA) River (Discharge Point 005), under Order No. R4-2017-0124, NPDES No. CA0056014, issued by the Los Angeles Regional Water Quality Control Board (Regional Board) to LVMWD[1]. Tapia WRF discharges to Arroyo Calabasas, a tributary to the LA River when necessary to comply with a seasonal discharge prohibition for Malibu Creek from April 15th to November 15th. [2]

Order No. R4-2017-0124 revised the chloride effluent limitation for Tapia WRF discharge to the LA River from 190 mg/L to 150 mg/L. The Tapia WRF is not able to consistently comply with the new chloride effluent limit and, therefore, LVWMD requested a time schedule order (TSO). A TSO (Order No. R4-2017-0125) was issued by the Regional Board that contains interim limits and milestones to allow the Tapia WRF time to achieve consistent compliance.

The TSO requires specific actions to identify and evaluate effluent chloride sources, and identify options to reduce chloride sources or regulatory options to amend the new effluent limitation, which may include a Site-Specific Objective, a Basin Plan Amendment, and/or a discharge specific variance. The TSO establishes a schedule to comply with or recommend regulatory actions to address Tapia WRF's ability to comply with the effluent limitation of 150 mg/L, during which time, Tapia WRF will be subject to an interim effluent limitation of 190 mg/L.

The first requirement and milestone in the TSO is to investigate chloride sources and submit a Chloride Source Investigation Report by April 1, 2018. This report is intended to fulfill this requirement. **Table 1-1** lists the required elements of the Source Investigation and the sections within this report addressing each element.

Table 1-1. TSO (Order No. R4-2017-0125) Requirements and Schedule

Requirement	Section
1. Identify chloride levels in source waters delivered to residents in LVMWD's service area from 1999-present. The composition of the various sources of water delivered to the service area shall be described, including but not limited to water from the State Water Project (SWP), Colorado River Aqueduct, Los Angeles Department of Water and Power, and Las Virgenes Reservoir.	**Section 2**

[1] LVMWD is the Permittee under Order No. R4-2017-0124 though Tapia WRF is jointly owned/operated by the JPA.

[2] Tapia WRF is subject to flow augmentation requirements from the National Marine Fisheries Service (NMFS) in Malibu Creek. Discharges to Malibu Creek to sustain required flows are exempt from the discharge prohibition.

Requirement	Section
2. Identify chloride concentrations in the influent, effluent, and receiving water from 1999 to present, if available.	**Section 3**
3. Describe impacts of drought, water conservation, and state-wide water efficiency standards on final effluent chloride concentrations.	**Section 4**
4. Identify potential impacts from unique geology in the Malibu Creek Watershed on chloride levels.	**Section 5**
5. Identify impacts to the final effluent chloride concentrations from the use of sodium hypochlorite at the Tapia WRF, Westlake Filtration Plant and in potable water distribution system maintenance.	**Section 6**
6. Investigate the number of water softeners in the service area using available data.	**Section 7**
7. Identify possible source reduction activities including, but not limited to, chlorine dose optimization and ultraviolet (UV) light disinfection	**Section 8**

2 LVMWD Source Water Chloride Levels

The TSO requires that LVMWD "Identify chloride levels in all source waters delivered to residents in LVMWD's service area from 1999 to present. The composition of the various sources of water delivered to the service area shall be described, including but not limited to water from the SWP, Colorado River Aqueduct, Los Angeles Department of Water and Power, and Las Virgenes Reservoir."

LVMWD, like many potable water suppliers in the Los Angeles Region, is entirely dependent on imported water from the Metropolitan Water District (MWD) of Southern California to provide water to its service area. Water treated at MWD's Jensen Treatment Plant (Jensen Plant) in Sylmar, California, either flows directly into the LVMWD water distribution system or is stored in Las Virgenes Reservoir, owned by LVWMD. Water from Las Virgenes Reservoir is used as needed and treated at Westlake Filtration Plant through filtration and disinfection using chloramines prior to entering the distribution system[3].

MWD supplies are comprised of water imported from Northern California's San Francisco Bay Delta through the SWP, and from the Colorado River through the Colorado River Aqueduct. The Jensen Plant occasionally receives small volumes of water from the Los Angeles Aqueduct, which is owned and operated by the Los Angeles Department of Water and Power and imports water to the City of Los Angeles from the Owens Valley. LVMWD's water quality consumer reports describe SWP water from MWD as the major source of potable water for the LVMWD service area[3].

Annual averages and ranges of chloride concentrations from 2005 to 2016[3] are presented in **Table 2-1** and **Figure 2-1** for potable water supplied by LVMWD, as well as effluent from the MWD Jensen Plant. A complete dataset prior to 2005 is not available, and this time frame is considered to be the most representative of current conditions and, therefore, most useful for evaluating chloride sources.

Increases in chloride concentrations in water supplied by LVMWD compared to water purchased from MWD observed in **Table 2-1** and **Figure 2-1** may be related to higher chloride concentrations in water supplied from Las Virgenes Reservoir. Although Las Virgenes Reservoir stores the same imported water as is supplied directly to the distribution system, chloride levels within the reservoir may be elevated due to groundwater infiltration or evaporation. Chloramination treatment at Westlake Filtration Plant may also be contributing to chloride levels.

The volume of water produced at Westlake Filtration Plant was available from 2013 to 2015. These data, along with the proportion of water delivered by LVMWD which was stored in Las Virgenes Reservoir and treated at Westlake Filtration Plant prior to distribution are shown in **Table 2-2**. The total volume delivered to LVMWD's service area was estimated based on water deliveries reported in LVMWD's 2015 Urban Water Management Plan (UWMP)[4], which indicated that LVMWD delivered between 17,300 and 18,400 acre-feet per year of potable water

[3] http://www.lvmwd.com/your-water/water-quality Chloride concentrations reported from LVMWD Annual Water Quality Reports provided to water customers. The 2016 Annual Water Quality Report is the most recently available report.

[4] LVMWD, 2016. 2015 Urban Water Management Plan. August 17, 2016.

to its service area from 2010 to 2015. Water stored in Las Virgenes Reservoir comprised a lower percentage of the total water supply in 2015 than in 2013 and 2014, which is reflected in **Figure 2-1** and **Table 2-1.** Chloride levels in the LVMWD water supply were closer to the levels observed in imported water from MWD in 2015, and were higher than levels in imported water in 2013 and 2014, when water stored in Las Virgenes Reservoir comprised a greater portion of water delivered by LVMWD.

Table 2-1. Chloride Concentrations (mg/L) in LVMWD Source Water

Year	LVMWD		MWD Jensen Effluent	
	Average	Range	Average	Range
2005	62	48-77	52	47-65
2006	56	44-69	50	44-56
2007	66	50-82	61	40-70
2008	89	73-130	75	72-80
2009	81	79-83	79	77-82
2010	75	69-78	79	67-80
2011	70	51-87	64	59-69
2012	74	50-92	56	50-63
2013	81	76-94	76	75-77
2014	91	86-96	86	85-86
2015	85	79-93	86	85-86
2016	95	92-98	93	89-97

Table 2-2 Annual Proportion of LVMWD Water Supply from Las Virgenes Reservoir

Year	Volume produced at Westlake Filtration Plant (acre-feet)	Estimated % of Total Potable Water Delivered
2013	1,700	9%
2014	820	5%
2015	160	<1%

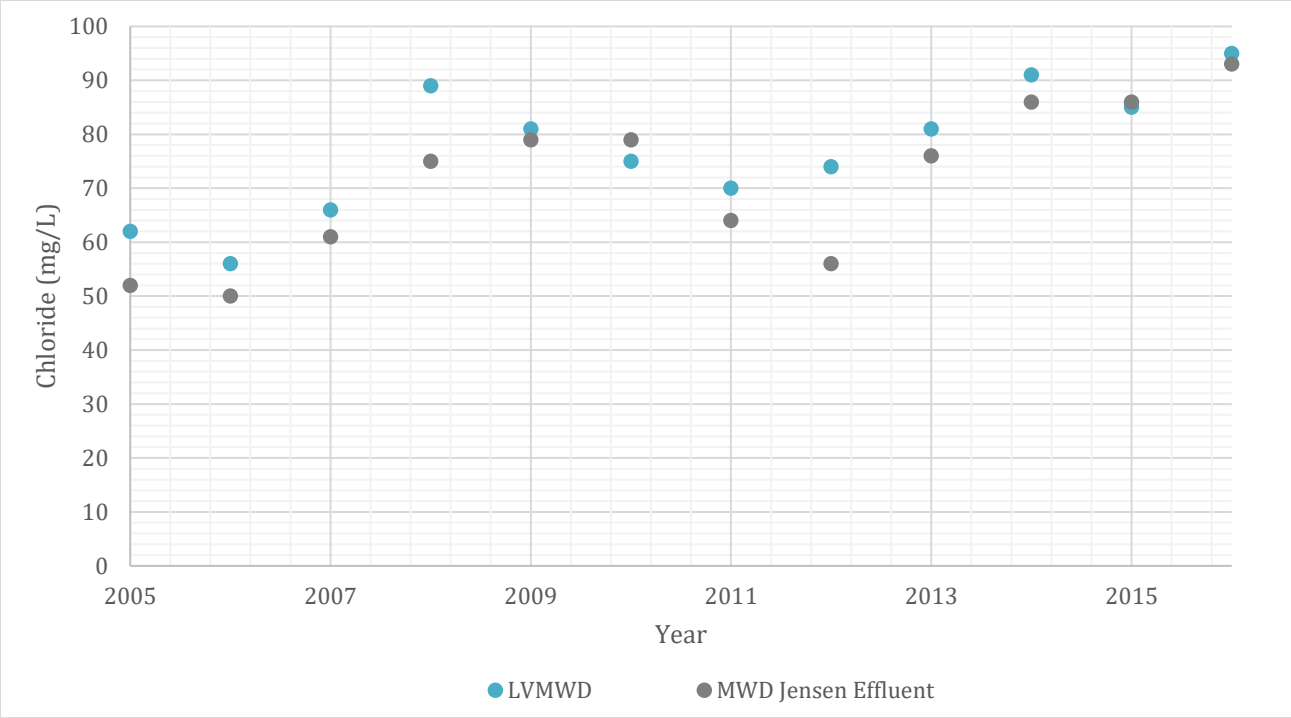

Figure 2-1. Average Chloride Concentrations in LVMWD Source Water

3 Influent, Effluent and Receiving Water Chloride Levels

The TSO requires that LVMWD "Identify chloride concentrations in the influent, effluent, and receiving water from 1999 to present, if available." Available chloride water quality data for Tapia WRF's influent and effluent, as well receiving water data downstream of the effluent discharge to the LA River is described and presented below.

3.1 EFFLUENT CHLORIDE LEVELS

Effluent chloride concentration data were available from 2002 through 2017. Prior to 2002, effluent water quality samples were taken from a different monitoring station which is not representative of current practice. Tapia WRF primarily discharges to Malibu Creek at discharge point EFF-001. The annual volumes discharged to the LA River compared to volumes discharged to Malibu Creek (EFF-001) from 2004 through 2017 are presented in **Table 3-1,** which reflect the limited use of the LA River discharge point. LA River discharge flow data were not available prior to 2004. Limited chloride concentration data from effluent discharge to the LA River (EFF-005) were available due to the low volumes and sporadic frequency of discharge to the LA River.

Table 3-1. Annual Influent and Effluent Flows to Malibu Creek and the LA River, 2004-2017

Year	Total Annual Flow to Malibu Creek from EFF-001 (MG)	Total Annual Flow to LA River from EFF-005 (MG)
2004	1,061	25
2005	1,469	39
2006	1,087	79
2007	768	49
2008	1,055	41
2009	976	209
2010	1,128	174
2011	1,029	184
2012	784	116
2013	656	69
2014	609	0
2015	620	20
2016	2,130	16
2017	867	0

Although limited effluent water quality data are available corresponding to discharge at EFF-005, effluent water quality does not depend on the discharge point used. **Figure 3-1** shows a time series plot of final effluent concentrations from 2002 to 2017, which are compared to the interim and final effluent limitations for discharge to the LA River, and to water supply concentrations presented in **Section 2**. Grab and composite samples are distinguished on the plot. The effluent chloride concentrations show similar trends when compared to water supply data. The effluent chloride concentrations show periodic fluctuations, with increases in chloride levels corresponding to drought conditions. Effluent chloride levels have also gradually increased overall from 2002 to 2017.

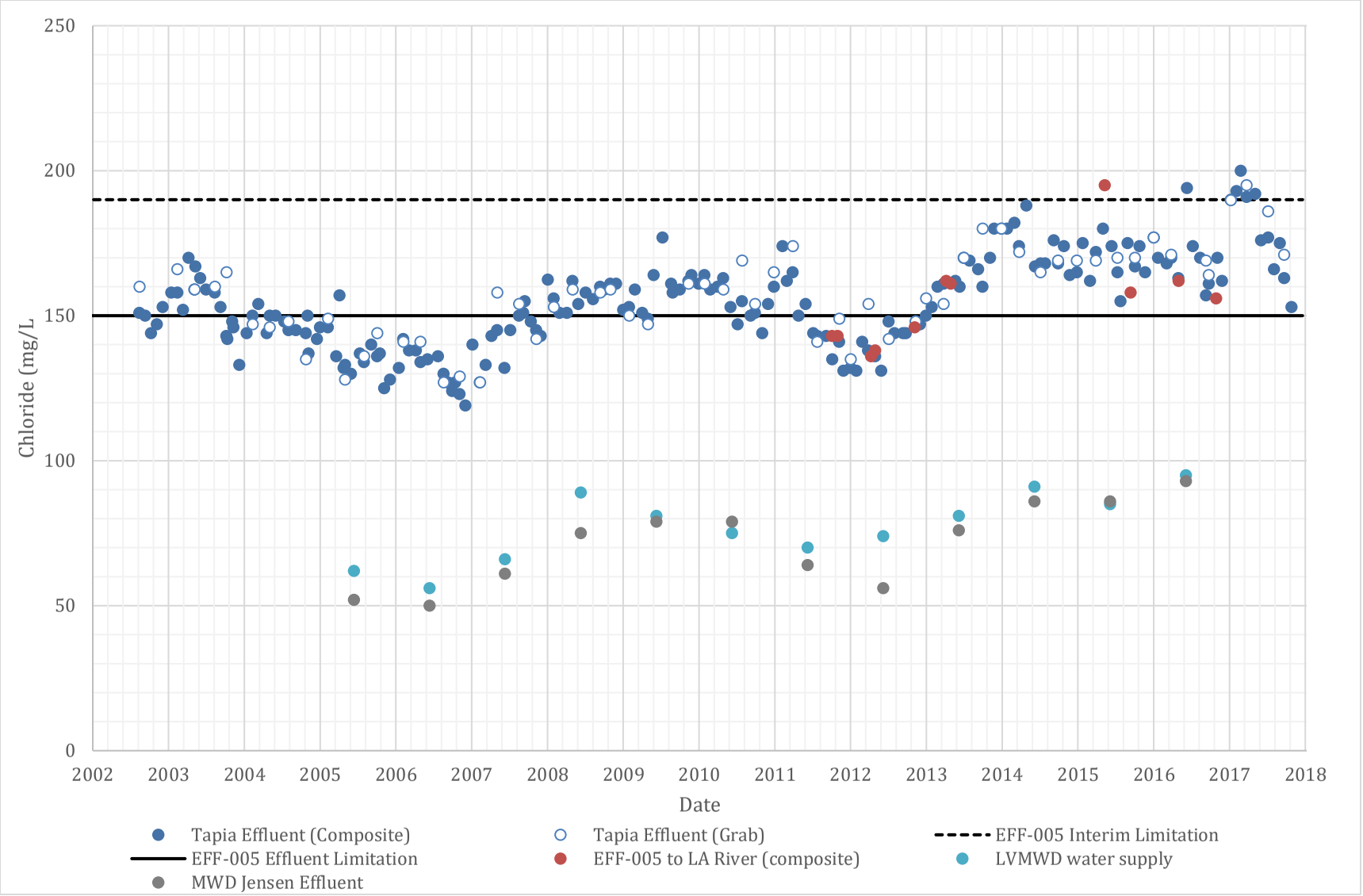

Figure 3-1. Tapia Effluent Chloride Concentrations, 2002-2017, and Water Supply Chloride Concentrations, 2005-2016

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3.2 INFLUENT CHLORIDE LEVELS

The TSO requires monitoring for chloride in the influent from its adoption through January 1, 2021. However, influent chloride monitoring is not required by Order No, R4-2017-0124, nor has it been required by any NPDES permit for Tapia WRF from 1999 to the present. Therefore, chloride concentration data is only available from June through December 2017.

Influent compared to effluent chloride data from June through December 2017 is shown in **Figure 3-2. Figure 3-2** also shows that influent concentrations occasionally exceeded the effluent limitation of 150 mg/L.

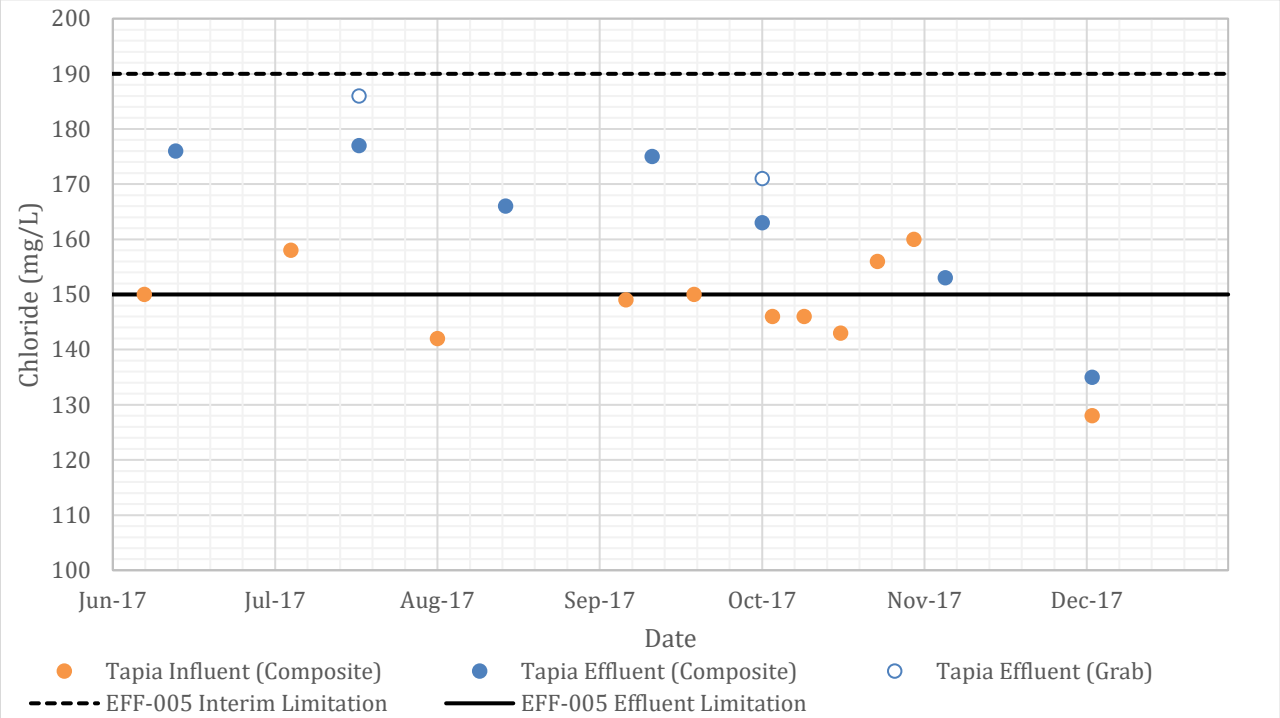

Figure 3-2. Tapia Influent and Effluent Chloride Concentrations (mg/L), June-December 2017

3.3 RECEIVING WATER CHLORIDE LEVELS

The available receiving water data corresponding to Tapia WRF's discharge to the LA River was collected through NPDES permit required monitoring at RSW-LA002D, which is located downstream of EFF-005, inside an underground storm drain that eventually daylights into Arroyo Calabasas. Receiving water concentrations compared to effluent concentrations from EFF-005 are shown in **Figure 3-3.** Concentrations at RSW-LA002D closely follow available effluent concentration data from EFF-005. However, as RSW-LA002D is located inside of a storm drain, it is likely that discharge from EFF-005 comprises the majority of flow at RSW-LA002D, with the exception of during storm events.

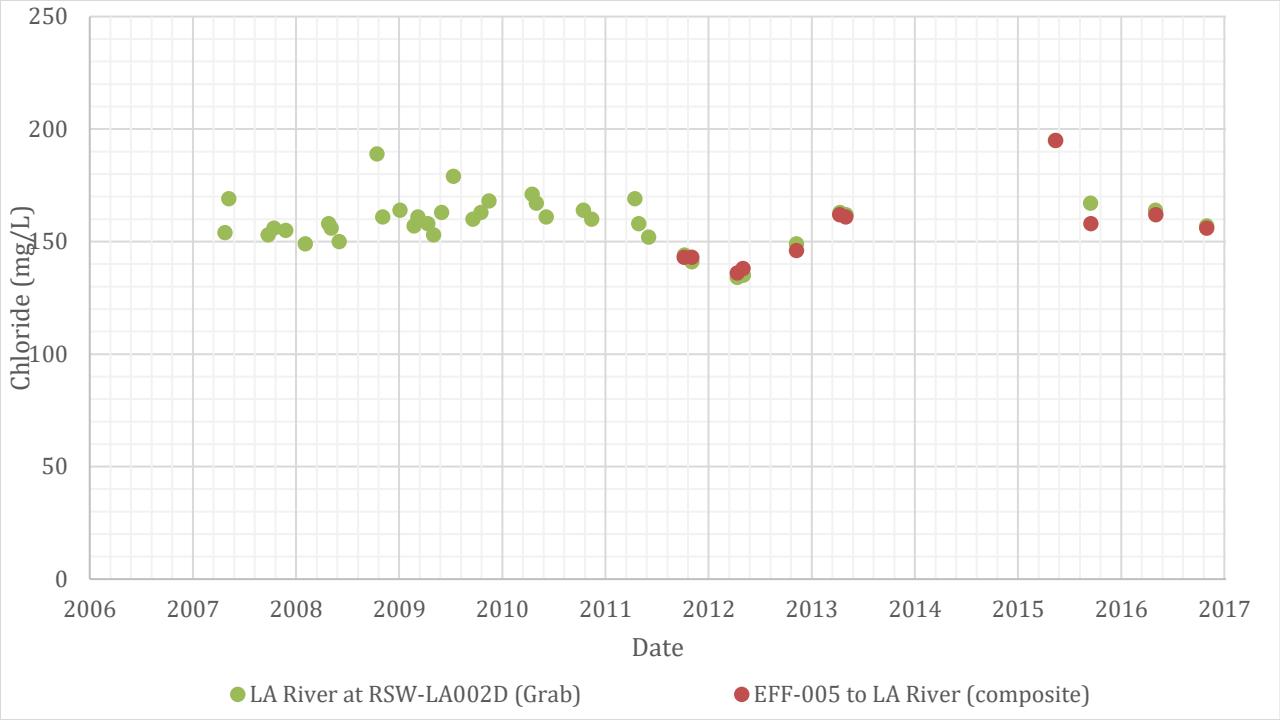

Figure 3-3. LA River Receiving Water and Effluent Chloride Concentrations

4 Impacts of Drought, Water Conservation, and Statewide Water Efficiency Standards on Chloride Levels

The TSO requires that LVMWD "Describe impacts of drought, water conservation, and state-wide water efficiency standards on final effluent chloride concentrations."

Drought periods in California, such as the recent drought from 2012 to 2016, have well known impacts on water supply composition in Southern California, and subsequently on the quality of publicly-owned treatment works' (POTWs') effluent. Increased chloride levels in water supply, as well as decreased water use, have historically impacted POTWs in the Los Angeles Region and have prompted regulatory relief from the Regional Board acknowledging these impacts[5].

Figure 4-1 shows Tapia WRF effluent chloride concentration from 2002-2017, Tapia WRF influent flows from 1999-2017, along with coinciding periods of drought. **Figure 4-1** shows periodic increases in chloride concentrations in MWD Jensen Plant effluent, LVMWD water supply and Tapia WRF effluent corresponding to drought conditions from 2012 through 2016, 2007 through 2009 and 2001 through 2002[6]. This demonstrates that chloride concentrations in water supplied by MWD increase during drought conditions, and that this increase proportionally impacts Tapia WRF effluent chloride concentrations. **Figure 4-1** also shows long term increases in chloride concentrations, which reflect sustained changes in MWD source water composition, due to increasing salinity levels in the San Francisco Bay-Delta and increased reliance on deliveries from the Colorado River Aqueduct.

Water conservation, both in response to drought conditions and long term statewide water sustainability goals, also impacts chloride concentrations entering Tapia WRF, as less water use results in lower dilution of chloride sources and higher concentrations. Statewide restrictions on water use during the most recent drought from 2012 to 2016 culminated with restrictions imposed by the State Water Resources Control Board aimed to achieve a 25% reduction in urban potable water use[7]. LVMWD issued mandatory conservation measures in response to these restrictions, including prohibitions on irrigation, washing paved surfaces with potable water, and requirements for home car washing, fountains, hotels and restaurants, and reported annual water conservation rates as high as 27%[8] during the drought.

In addition to drought triggered water conservation, both statewide and local long term water use reduction goals correlate to long term increases in chloride concentrations. State laws requiring reduction in per capita potable water use by 20% by 2020 have been in place since 2009[9]. LVMWD implements pricing structures encouraging water conservation, conducts public

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[5] In 1990, the Regional Board adopted Resolution No. 90-004 (*Effects of Drought-Induced Water Supply Changes and Water Conservation Measures on Compliance with Waste Discharge Requirements within the Los Angeles Region)* which provided regulatory relief for POTWs in response to drought conditions.

[6] United States Geological Survey (USGS), 2017. 2012-2016 California Drought: Historical Perspective. Accessed February 15, 2017. https://ca.water.usgs.gov/california-drought/california-drought-comparisons.html

[7] State of California Executive Department, 2015. Executive Order B-29-15.

[8] http://www.lvmwd.com/your-water/drought

[9] Kennedy/Jenks Consultants, 2016. 2016 Urban Water Management Plan. Prepared for Las Virgenes Municipal Water District. August 17, 2016.

outreach and education, including posting indoor and outdoor water conservation tips on their website[10] and implements rebate programs for high efficiency toilets and washing machines, irrigation controllers, and rain barrels as part of its overall strategy to meet these goals. Changes in water demand due to conservation are evident in decreases in influent flow to Tapia WRF over time, and coincide with increases in effluent chloride concentrations, as shown in **Figure 4-1**.

[10] http://www.lvmwd.com/for-customers/conservation

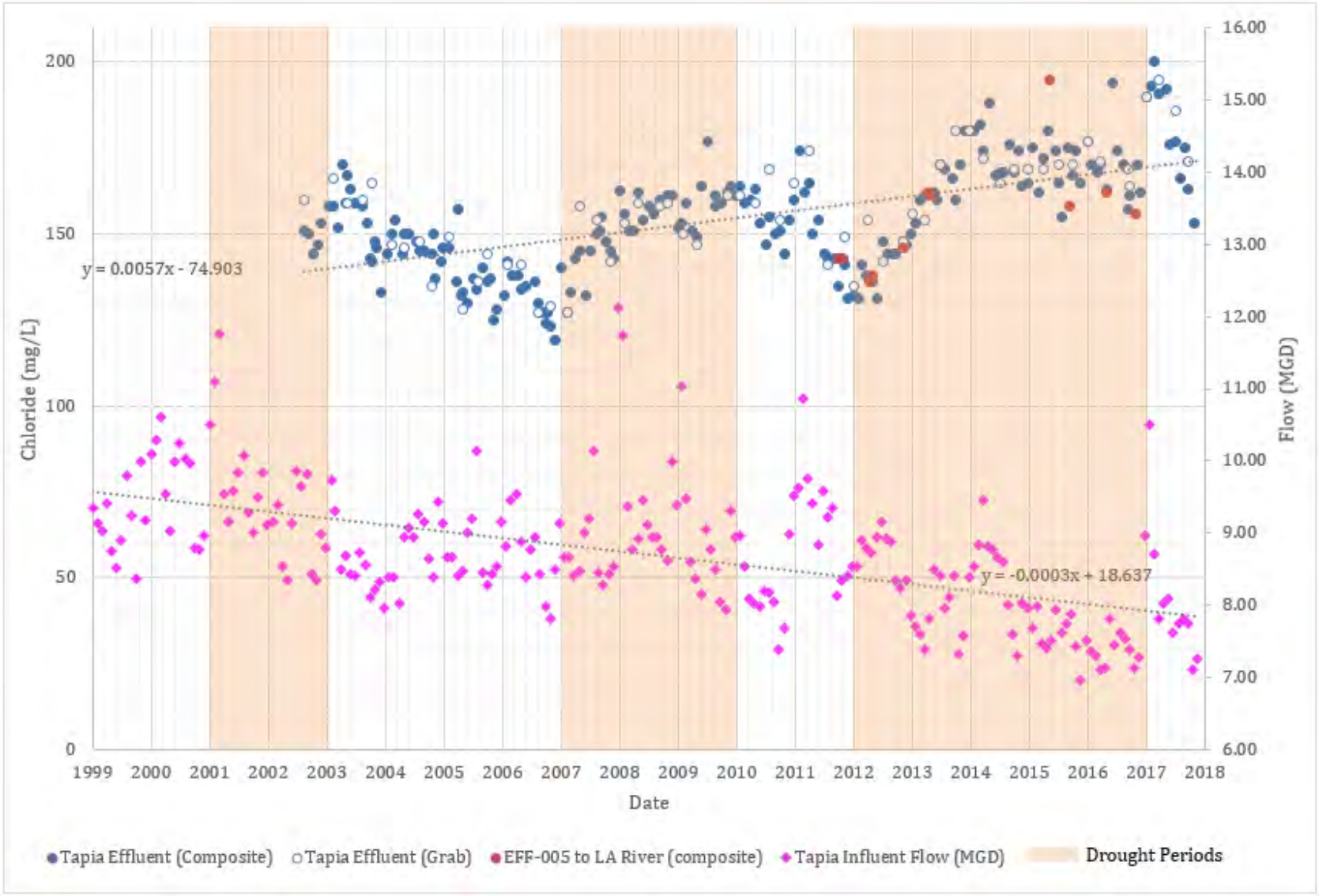

Figure 4-1. Tapia Average Monthly Influent Flows (1999-2017), Tapia Effluent Chloride Concentrations (2002-2017), and Drought Conditions

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5 Impacts of Unique Geology on Chloride Levels

The TSO requires that LVMWD "Identify potential impacts from unique geology in the Malibu Creek Watershed on chloride levels." This section presents an evaluation of whether these features impact Tapia WRF chloride levels through groundwater influence at Las Virgenes Reservoir or through inflow and infiltration to the collection system.

Local unique geological features, such as the Monterey Modelo formation, impact groundwater quality in the Malibu Creek Watershed, where the Tapia WRF service area is located, and subsequently impact surface water quality due to connections with groundwater.

The Monterey Modelo formation is a large formation of petroleum source rocks with exposures in the northern tributaries of Malibu Creek, and is cited as contributing to high levels of other constituents in regional water bodies, such as metals, nutrients, sulfate, specific conductivity (SC) and total dissolved solids (TDS) in Malibu Creek, nutrients in Lake Calabasas and selenium in the LA River. The Monterey Modelo formation is also linked to high TDS levels in local groundwater[11]. There is no direct linkage to chloride; however, chloride could be one of the components contributing to SC.

LVMWD Report No. 2475, *Water Quality in the Malibu Creek Watershed, 1971 – 2010*[11] assessed water quality impacts from the Monterey Modelo Formation in Malibu Creek Watershed. The report evaluated surface water quality data throughout the watershed from 1998-2009 from LVMWD, Heal the Bay, and the City of Calabasas Malibu Creek Watershed Monitoring Program. Chloride data was not evaluated in the study, however the results based on different water quality parameters show the spatial extent of the impact of the Monterey Modelo Formation. **Figure 5-1** shows average SC levels over the period from 1998-2010 at monitoring stations throughout Malibu Creek Watershed. Monterey Modelo formation impacts to water quality originate in the upper reaches of Malibu Creek Watershed (Lindero, Medea, Palo Comado, Chesebro and Las Virgenes Creeks), but do not impact the portion of the watershed containing Las Virgenes Reservoir.

Given that chloride impacts due to Monterey Modelo Formation have not been assessed, impacts on inflow and infiltration within the collection system are unknown. **Figure 5-2** shows the extent of the Tapia WRF service area, which includes areas where groundwater quality is impacted by the Monterey Modelo formation shown in **Figure 5-1**.

[11] LVMWD, 2012. Water Quality in the Malibu Creek Watershed, 1971-2010. Submitted by the Joint Powers Authority of the Las Virgenes Municipal Water District and the Triunfo Sanitation District to the Los Angeles Regional Water Quality Control Board in compliance with Order No. R4-2010-0165 on March 30, 2011. Revised 6/13/2012.

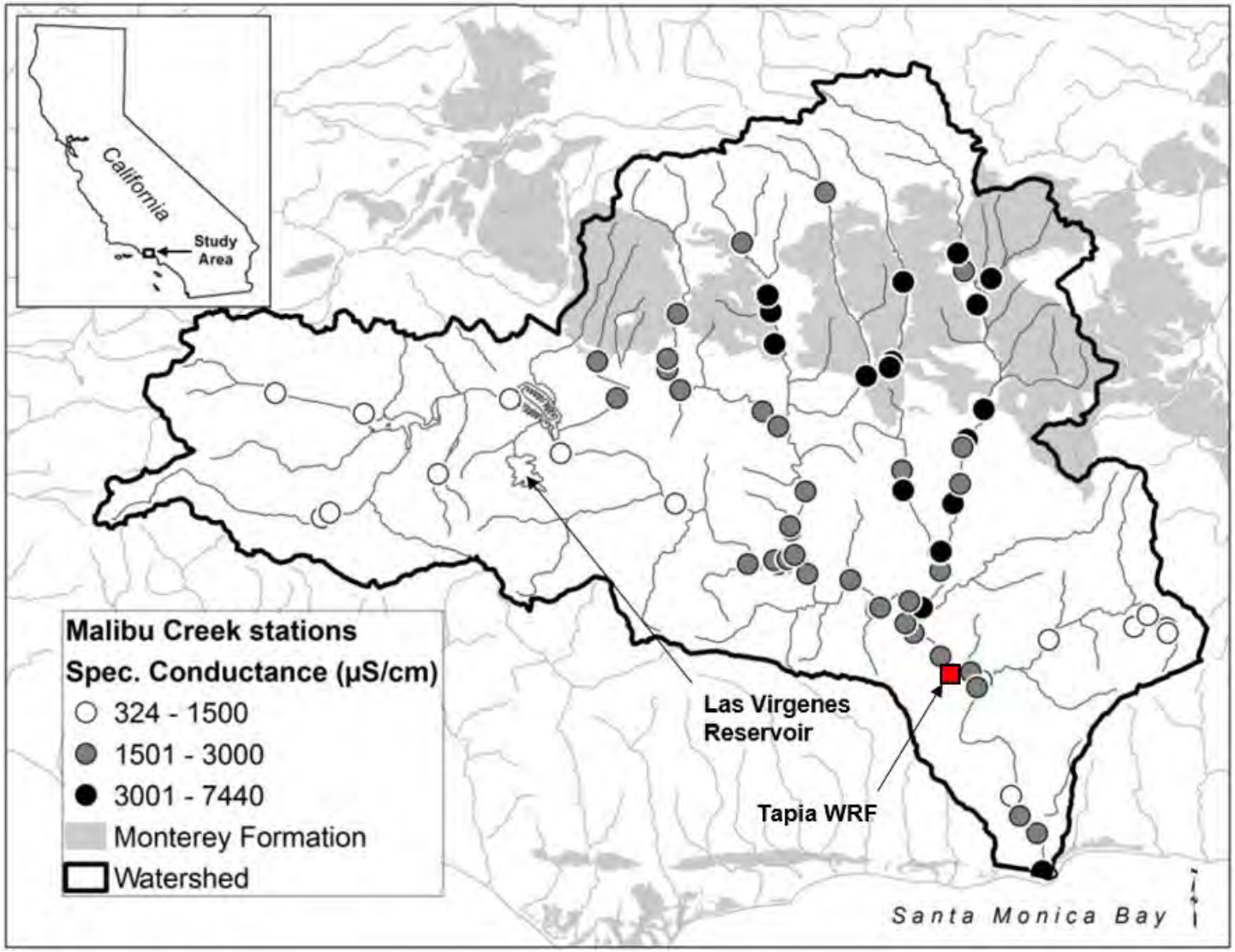

Figure 5-1. Average Specific Conductivity (µS/cm) in Malibu Creek in Relation to Monterey Modelo Formation, 1998-2010

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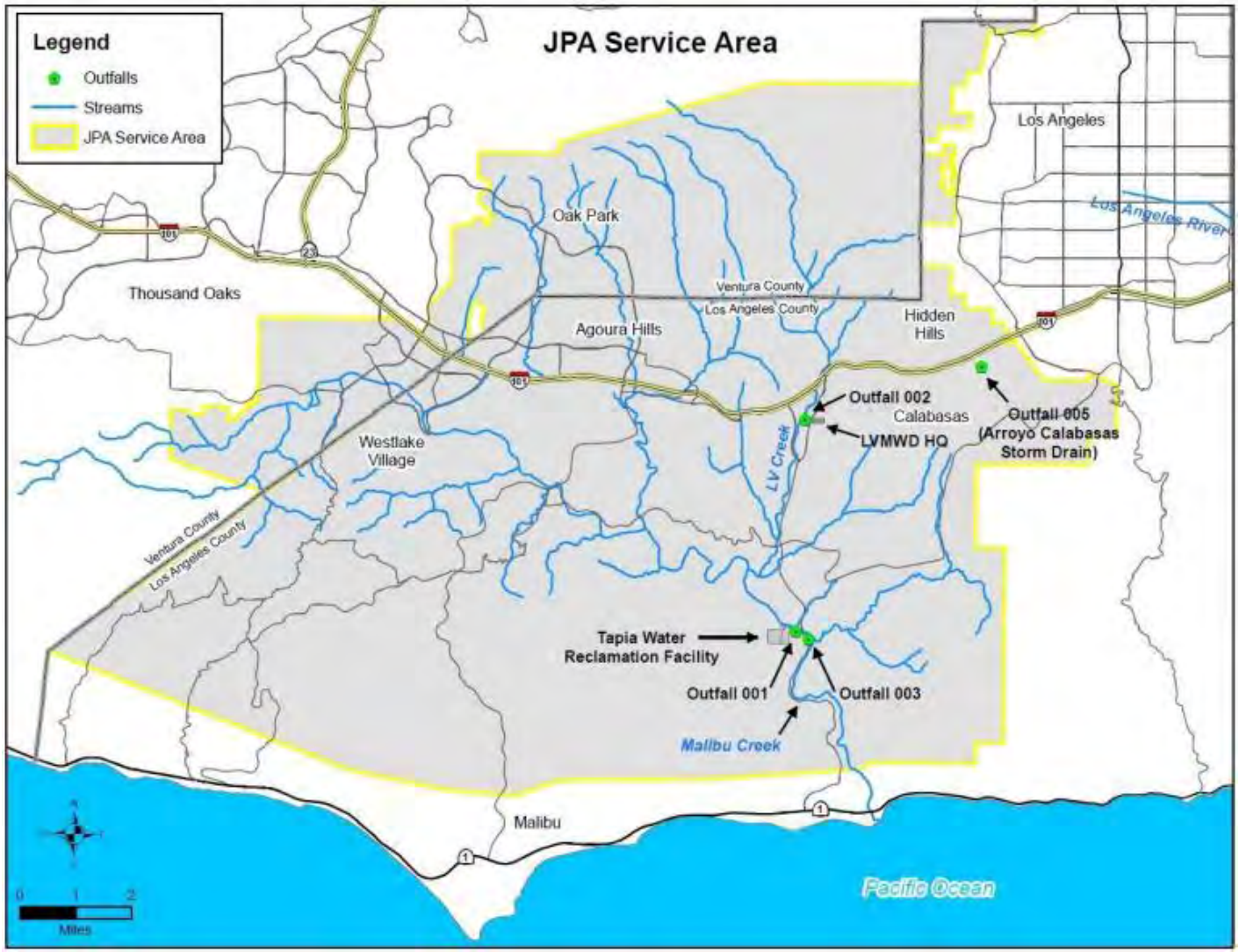

Figure 5-2. Tapia WRF Location and Service Area

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6 Impacts of Sodium Hypochlorite on Effluent Chloride Concentrations

The TSO requires that LVMWD "Identify impacts to the final effluent chloride concentrations from the use of sodium hypochlorite at the Tapia WRF, Westlake Filtration Plant and in potable water distribution system maintenance."

6.1 CHEMICAL FEEDS AT TAPIA WRF

Annual average sodium hypochlorite use relative to influent flow at Tapia WRF is shown in **Figure 6-1**. Sodium hypochlorite use data were available from 2005 through 2017. **Figure 6-1** also shows annual average effluent concentrations for the same period.

Sodium hypochlorite use gradually decreased from 2005 to 2014. Effluent chloride concentrations gradually increased during this time. However, effluent concentrations do appear to correspond to alternating increases and decreases of greater magnitude in sodium hypochlorite use from 2015 through 2017.

Based on influent and effluent chloride concentrations presented in **Figure 3-2**, at most, sodium hypochlorite use contributed to a 9-10% increase (~16 mg/L) in final chloride effluent concentrations compared to influent concentrations.

6.2 CHEMICAL FEEDS AT WESTLAKE FILTRATION PLANT

LVMWD purchases imported potable water from MWD, which either flows directly into the LVMWD distribution system or to storage in Las Virgenes Reservoir. Water stored in Las Virgenes Reservoir is treated using filtration and chloramine disinfection. Based on differences between MWD Jensen Effluent and LVMWD chloride concentrations, at most, chemical feeds for chloramination at Westlake Filtration Plant contribute to a 5-6% increase in chloride concentrations, on average, in LVMWD potable water (see **Figure 2-1).** However, this increase may also be associated with evaporation at Las Virgenes Reservoir.

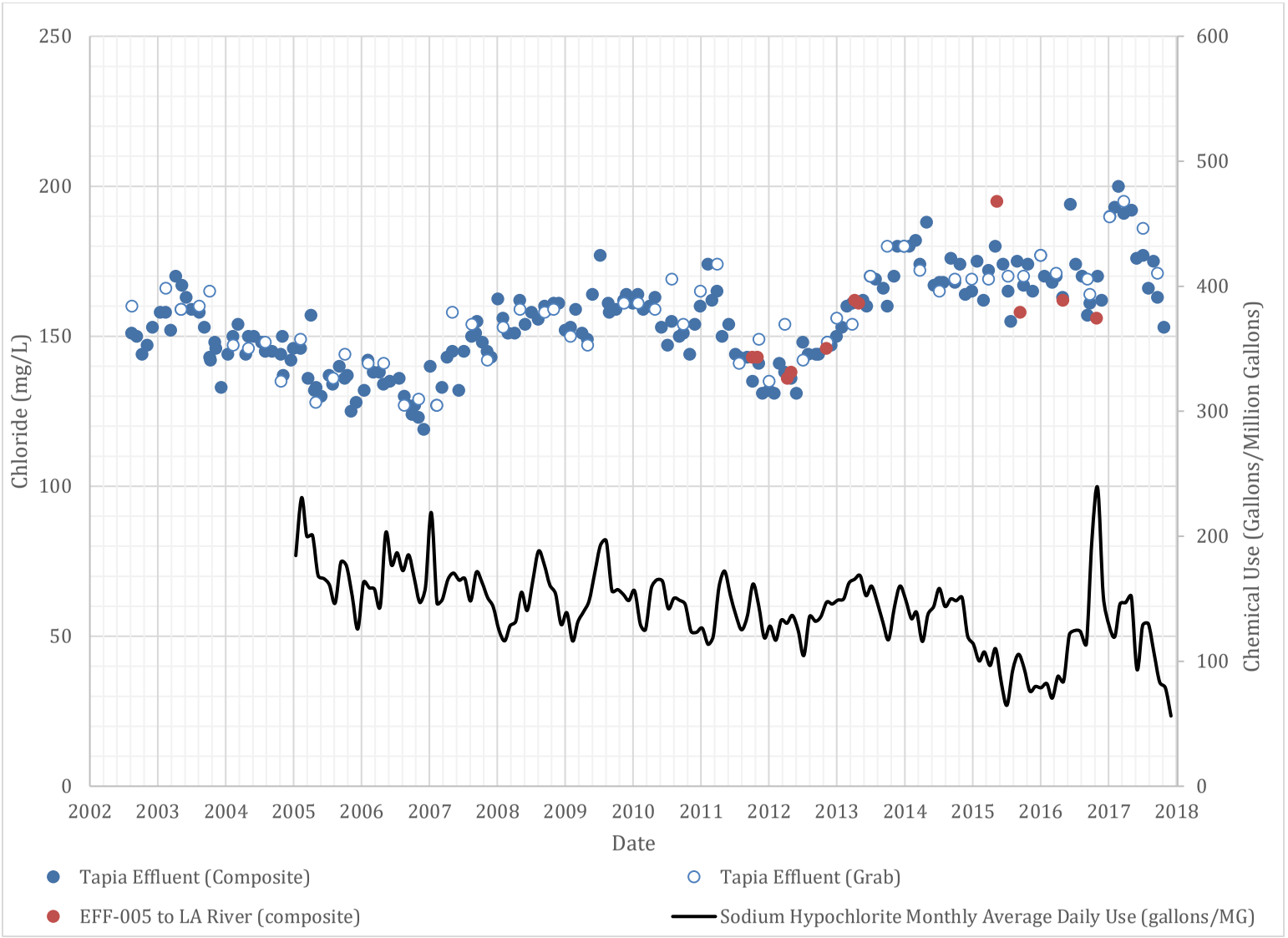

Figure 6-1. Chemical Use at Tapia WRF per Million Gallons of Influent Flow, 2007-2017

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7 Service Area Water Softeners

The TSO requires that LVMWD "Investigate the number of water softeners in the service area using available data".

The percentage of households with residential self-regenerating water softeners (SRWS) can be estimated using water supply hardness, and data relating water supply hardness and percentage of households with SRWS in representative communities. Based on LVMWD consumer water quality reports, average water supply hardness for the period from 2005-2016 was 130 mg/L as $CaCO_3$.

Information from other communities in California, shown in **Table 7-1**, was used to estimate an approximate percentage of households with SRWS. Based on data from other Southern California communities and the relatively low average hardness of the LVMWD water supply, it is estimated that less than 5% of households in the Tapia WRF service area have SRWS. Based on the service area population estimated in Order No. R4-2017-0124 of 100,000 people, and the US Census Bureau estimate of 2.95 persons per household in California[12], the service area is comprised of approximately 34,000 households. Therefore, it is estimated that the number of households with SRWS within the Tapia WRF service area is less than 1,700.

Table 7-1. Percent of Households with SRWS in Representative California Communities[13]

Location of Community	Average Water Supply Hardness (mg/L)	% of Households with SRWS
Southern California	230	5%
Central Valley	58	10%
Southern California	450	15%
Southern California	500-800	20%
Central Valley	400	40%

[12] https://www.census.gov/quickfacts/CA

[13] Elzufon, Betsy, LWA, 2008. How to Address Challenging Salinity Limitations Without Going Broke: Source Control and Other Options. Presented at CVCWA Annual Conference, May 15, 2008.

8 Chloride Loads, Sources and Source Reduction Activities

The TSO requires LVMWD to "Identify possible source reduction activities including, but not limited to, chlorine dose optimization and ultraviolet light disinfection." Effective source reduction activities are those associated with the most significant controllable sources. The information presented above allows the assessment of chloride sources to determine which source reduction activities are likely to achieve measurable reductions.

8.1 SOURCE EVALUATION

The monthly average influent chloride concentration during the period from June through December 2017 was 148 mg/L. Using the monthly average influent flow during that period, 7.6 MGD, the average influent chloride load was 9,400 lbs/day. Over the same period, the average effluent load was 10,600 lbs/day, based on an average monthly effluent concentration of 164 mg/L and an average monthly effluent flow of 7.8 MGD. Therefore, the average influent chloride load to Tapia WRF accounts for 89% of the effluent load. The remaining 11% may be due to chemical feeds. The following sources were evaluated, as discussed in previous sections, and their estimated load contribution is summarized below:

- Water Supply
- Water Softeners
- Chemical Feeds

Other possible sources, including industrial and commercial sources, as well as impacts from local geology through inflow and infiltration, are also discussed below.

8.1.1 Influent Loads

8.1.1.1 Water Supply Loads

For comparison to influent loads calculated based on data from late 2017, the water supply load was estimated from influent flows from June-December 2017 and from the average chloride concentration based on the available data. The estimated chloride load from the water supply is 4,900 lbs/day, and of that, it is estimated that 4,500 lbs/day can be attributed to water purchased from MWD, or approximately 92% of the load from LVMWD, as shown in **Table 8-1**. Approximately 400 lbs/day may be the result of evaporation or groundwater influence at Las Virgenes Reservoir or chloramination at Westlake Filtration Plant.

Table 8-1. Estimated Contribution of Water Supply to Influent Chloride Loads

Period	Average Influent flow June-Dec 2017 (MGD)	LVMWD		MWD	
		Average chloride 2005-2016 (mg/L)	Estimated chloride load (lbs/day)	Average chloride 2005-2016 (mg/L)	Estimated chloride load (lbs/day)
June-December 2017	7.6	77	4,900	71	4,500

8.1.1.2 Residential Sources

The number of households with SRWS is estimated to be approximately 1,700. Based on estimates from other chloride source reduction efforts[14], one residential water softener accounts for approximately 1.3 lbs/day of influent chloride loading. The chloride load from 1,700 water softeners is expected to be approximately 2,300 lbs/day.

In addition to water softener use, residential water uses, such as clothes washing, dishwashing, and regular toilet, faucet and shower uses, contribute to influent chloride loads to POTWs. These are typical residential water uses and are not controllable. It is estimated that residential wastewater contains ranges from 20-50 mg/L[15] of chloride above water supply concentrations and water softener contributions. For the purposes of estimating loads, chloride concentrations (above water supply and water softener contributions) in residential wastewater flows to Tapia WRF were estimated to be 35 mg/L. Tapia WRF's 2014 *Sanitation Master Plan*[16] estimated that approximately 77% of the influent wastewater to Tapia WRF is from residential uses. Based on average influent flow from the period of June through December 2017 of 7.6 MGD, the estimated average influent flow from residential sources was 5.8 MGD, and average influent load from residential uses is estimated to be 1,700 lbs/day, 16% of effluent loads.

8.1.1.3 Industrial Loads

Flows from Significant Industrial Users (SIUs) do not comprise a significant portion of flow or chloride load to Tapia WRF. There are two SIUs in the Tapia WRF service area, which are estimated to discharge up to 33,000 gallons per day, combined, to the collection system. Neither SIU exceeded the local limit for chloride for the Tapia WRF service area (175 mg/L) from January to June 2017[17]. Assuming compliance with local limits, the maximum possible chloride load from industrial users is 48 lbs/day, which comprise less than 1% of effluent loads.

8.1.1.4 Loads from Additional Sources

Water supply, residential and industrial loads comprise approximately 7,248 lbs/day of the 9,400 lbs/day total influent load. Additional sources are estimated to contribute approximately 23% of the influent load and may include:

- Commercial sources
- Collection system inflow and infiltration from groundwater

Tapia WRF's 2014 *Sanitation Master Plan* estimated that approximately 11% of the influent flow to Tapia WRF is from commercial uses, or 0.8 MGD. The chloride concentration in commercial wastewater is estimated to be 33 mg/L[18] based on other chloride source reduction

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[14] Estimates of chloride load reductions from removal of residential water softeners included in the Santa Clara River Chloride Reduction Ordinance of 2008 passed by the Board of Directors of the Santa Clarita Valley Sanitation District of Los Angeles County indicate that 1 residential water softener accounts for approximately 1.3 lbs/day of chloride loading. http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=4190

[15] Metcalf & Eddy Inc., Wastewater Engineering Treatment and Reuse, 4th ed. McGraw Hill, 2003.

[16] Kennedy Jenks Consultants, 2014. Sanitation Master Plan Update 2014 for the Joint Powers Authority of Las Virgenes Municipal Water District and Triunfo Sanitation District (JPA). June 2014. LVMWD Project No. 2560.00.

[17] LVMWD, 2017. Semi-Annual Pretreatment Report for the Period of January through June 2017.

[18] Sanitation Districts of Los Angeles County, 2012. 2012 Chloride Source Identification/Reduction, Pollution Prevention, and Public Outreach Plan. November 2012.

efforts in Southern California. The chloride load from commercial uses, such as medical facilities and laundries, is estimated to be 2% of effluent loads at 230 lbs/day.

Data is not currently available to estimate contributions from inflow and infiltration, however based on the load contributions from other quantified sources, inflow and infiltration is estimated to contribute approximately 2% of effluent chloride loading. The difference between identified source loads and total influent load may also be related to uncertainties and data variability associated with the estimated source analysis.

8.1.2 In-Plant Loads

During the period of June-December 2017, there was a 10-11% increase in average chloride loads from influent to effluent, indicating that approximately 1,200 lbs/day of chloride load are attributed to sources within the Tapia WRF treatment system. Sodium hypochlorite use at Tapia WRF has the potential to contribute to in-plant loads.

8.2 SUMMARY AND SOURCE REDUCTION ACTIVITIES

Table 8-2 and **Figure 8-1** show a summary of estimated loads from sources of chloride in Tapia WRF effluent for the period from June through December 2017.

Table 8-2. Summary of Estimated Chloride Loads to Tapia WRF, June-December 2017

Source	Estimated Load	% Contribution to Effluent Load
Influent sources	**9,400 lbs/day**	**89%**
Quantified influent sources	*9,178 lbs/day*	*87%*
Water supply	4,900 lbs/day	46%
Industrial sources (maximum)	48 lbs/day	1%
Residential water softeners (maximum)	2,300 lbs/day	22%
Residential uses	1,700 lbs/day	16%
Commercial uses	230 lbs/day	2%
Unidentified influent sources		*2%*
In-plant sources (i.e., sodium hypochlorite)	**1,200 lbs/day**	**11%**
Average Effluent Load, June-December 2017	**10,600 lbs/day**	

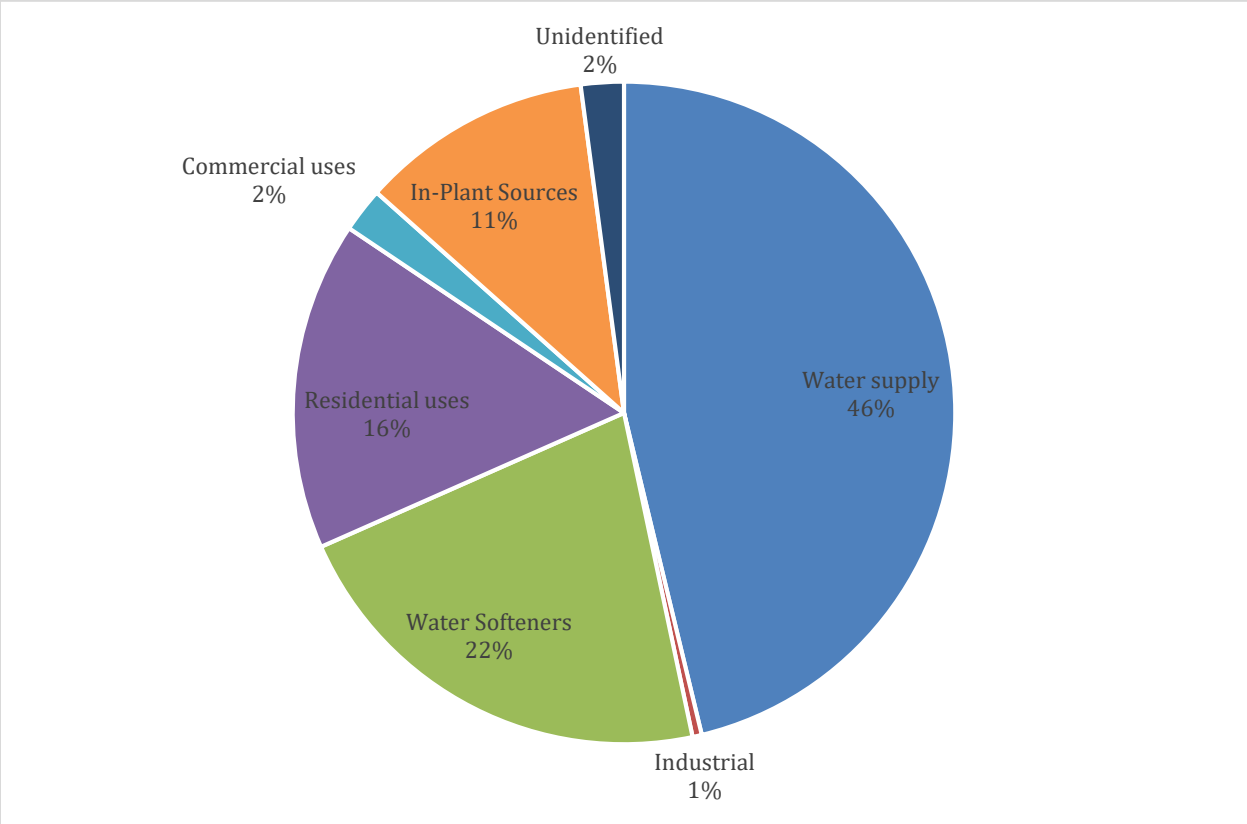

Figure 8-1. Summary of Estimated Chloride Loads to Tapia WRF, June-December 2017

The most significant influent sources include the water supply and residential water softeners, which are estimated to contribute to 46% and 22% of effluent chloride loads, respectively.

Water supply is generally considered to be uncontrollable. Water purchased from MWD accounts for approximately 96% of the chloride load in the water supply, and is not controllable by LVMWD. Evaporation or groundwater influence at Las Virgenes Reservoir or chloramination at Westlake Filtration Plant contribute to a minimal portion of the water supply loading. While there may be control strategies available to address the loading from Las Virgenes Reservoir, it represents less than 4% of the effluent chloride load.

Residential water softeners are considered a controllable source. Options to reduce the use self-generating water softeners and associated chloride discharges include[19]:

- Public outreach and education regarding the water quality impacts of water softeners and encouraging residents to voluntarily stop using water softeners to or to switch to non-salt discharging alternatives
- Ordinances banning or restricting residential self-generating water softeners

[19] Larry Walker Associates, Inc., 2012. Central Valley Clean Water Association DRAFT Salinity Management Practices for POTWs. September 2012

- Rebates or other financial incentives for residents to remove self-generating water softeners

Chloride sources from typical residential use are not controllable. Commercial sources may be controllable through outreach to commercial facilities discharging chloride or requiring facilities to implement best management practices to address chloride discharges.

Other unquantified sources, such as inflow and infiltration, may contribute approximately 2% of effluent chloride loads. If groundwater inflow and infiltration were determined to be a significant portion of the unquantified sources, it could be reduced through sanitary sewer retrofits.

Sodium hypochlorite use likely comprises the majority of in-plant chloride sources, which contribute an estimated 11% of the chloride load. Loads from sodium hypochlorite use can be reduced through chlorine dose optimization or conversion to UV or other non-chlorine disinfection.